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Rethinking Knowledge Management

From Knowledge Objects
to Knowledge Processes

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From Knowledge Objects to Knowledge Processes

With 14 Figures and 16 Tables

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Editors

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Preface

"Knowledge Management." Today, the term suggests a plurality of techniques, methods, and epistemologies: from information management to communication "capturing" and management to database management and visualization.

Historically, the term arose out of an interest in the Japanese methods of post-Fordist production, where methods such as just-in-time production, made possible in part by the greater use of information and communication technologies in the production process, were merged with a renewed interest in workers' experiences on the factory floor and "flattened," team-oriented, management structures. The flattening out of hierarchical management structures in the 1980s and 1990s and the emphasis upon team production emphasized *communication* and *learning* as a tool in production. From the other side of production—consumption—there was a renewed emphasis upon consumer driven production, inventory, and sales, stressing, again, the processes of communication and learning. Here, communication served the tailoring of products to consumers' desires—though not only to their desires, but increasingly, to the individual body's common, though unique, manners of attention (the "attention economy"). Learning, here, is the process of leading, and learning how to lead, consumers from one product to another within a common brand or corporate family which in the case of increasingly large multi-national conglomerates may encompass what previously had been unimaginably different production sectors and their products (cinema, newspapers, television, banking, etc.).

In the discourse of Knowledge Management in this period the term "social capital" became important (the term originates in Marx's writings). "Social capital" in the Knowledge Management context means the power of social relationships and intellectual creativity ("intellectual capital") to act as reserves of, and sources for, capital. The term gained popularity in management circles in North America and Europe at an historical moment when the traditional sources for increased productivity and profit were

constrained by increased labor costs, competition, and global trade. Add to this the shortage of employees in some labor sectors in the United States during the 1990s and the ease with which workers were both dismissed, and in some sectors, could move from one job to another, and one can then see that "knowledge" during this period was viewed not only as an unused productive capacity, but as a temporary or potentially transient resource within organizations.

Although, Knowledge Management had its genesis in industry, the service sector adopted KM practices as well in the 1990s. Just as re-engineering and quality management made their way from business to the non-profit sector, Knowledge Management, too, was seen as a way for government, education, and service agencies to manage "smarter," using technological tools. As distributed computer systems were installed in organizations outside of industry, knowledge artifacts were increasingly seen as important in a "knowledge society." After 2000, establishing knowledge management programs became a way for governmental entities and NGOs to keep up with trends in the profit sector, especially in the US, the UK, Australia, and the European Union. In the United States, the military saw the value in Knowledge Management and some chief information officers of the armed forces established elaborate KM practices and systems.

If the sociological history of Knowledge Management is clear, the epistemology of Knowledge Management has been anything but clear. The problem is: how does one locate knowledge, social relationships, and intellectual creativity within traditional management concepts and practices of quantitative financial models and accounting procedures? Beyond this, of course, and even more importantly from an executive managerial and consulting perspective, is the existence or development of conceptual categories so that profit by means of social and intellectual capital can be explained to stockholders, analysts, and the public at large as causes of measurable effects (hence, talk of the "new economy" of knowledge assets and of social and intellectual capital during the dot-com era). In brief, during the 1980s and 1990s knowledge assets and social and intellectual capital became viewed with renewed vigor as unused resources which can drive a new resurgence in both private and public organizational productivity.

The tools for arriving at a theory of knowledge which would serve the discourse of capital and the quantitative measure of productivity in modern management were readily available in the cultural stock of philosophical, psychological, and popular discourses about knowledge. Common Knowledge Management understandings of personal knowledge, which saw it as a quasi-physical mental entity stored in the mind, seated in the head and the brain, and expressed by spoken or written mediums, made use of popular psychology traditions and traditional cognitive science assumptions. The communicative adjunct to this mentalist epistemology was what Michael J. Reddy termed

the "conduit metaphor," namely, the idea that successful communication or understanding is a problem of transmitting ideational mental contents from one mind to another through a medium such as spoken or written language. Successful communication or understanding, according to this metaphorical "model," is the transmission and correspondence of intended ideas from one mind to another.

Together with the popular and spreading use of data-mining techniques, knowledge in many Knowledge Management epistemologies was, explicitly or implicitly, viewed as quasi-physical mental materials of memory, experience, and belief which needed to be formally expressed for common, public consumption. Whether it be an individual person or a group in which manners of belief and action were embodied, it was the duty of managers and knowledge management systems to encourage the expression of this knowledge through communication technologies and encourage the capture of this knowledge as information in information systems. What was implicit or tacit for persons or groups ought to become explicit, for the good of "sharing" information toward increased productivity and toward knowledge retention should the individual or group no longer be available.

Hence, in many Knowledge Management discourses, the concepts of "implicit" or "tacit" knowledge become equivalent to the traditional psychological notions of private and even "unconscious" knowledge, and the term "explicit" suggested the "public" expression of private or unconscious ideas. Knowledge needed to be formalized, captured, and perhaps even cleansed, so as to fit the modes for "public" information sharing and transfer allowed by communication and information technologies.

In the midst of this formalization of knowledge, what has sometimes been forgotten is the role of process and learning in any knowledge acquisition and expression—whether in terms of persons or groups. While a process oriented view of knowledge acquisition and expression stresses learning and development, classic Knowledge Management epistemologies have understood knowledge to be quasi-physical entities that are somehow "hidden" and need to be made visible in some "public" fashion that wasn't possible before. There is the suspicion in the "KM" tradition that employees don't know all that they know, both individually and as a group, but with appropriate management techniques and technical systems they can be coaxed to express that hidden knowledge.

But it is unclear whether any technical system now, or ever, can "capture" and represent knowledge if knowledge is an event and not a thing. Each representation of an event constitutes an event itself, and thus changes the nature of whatever expression emanated from the first event, ad infinitum. A photograph of a painting is not the painting itself. One can reproduce photographs to infinity and keep the values of each in a technical sense, but their distribution changes their meaning. One can, of course, then attempt to regulate the values of reception as well (as happens with the photographs of Hollywood 'stars,' politicians, etc.), and from that, regulate

the viewer's range of possible expression. This is what technical "Knowledge Management" systems have done by treating knowledge as information, but this, in turn, narrows the creativity of social interactions and personal thoughts by constraining the modes of expression allowed.

Yet, organizations, as any cultural institutions, have always regulated forms for expression, and thus, for knowledge. As always, the question, though, is that of to what degree does such regulation constrain or limit knowledge creation (if this is what we seek in knowledge management)? And if we wish to view "Knowledge Management" in its full, post-Fordist, range, we must also ask to what degree does the regulation of forms for expression stimulate consumption? Even in consumption and in attention economies, the range of desires cannot be infinite or completely variable—modern production cannot serve such nor can desires be fixated without limit upon given commodities or points of attention—overload and distraction make themselves present.

Hence, learning is an issue of process, and thus, to some degree, of management, but it is not a process that can be tied to absolute values and outcomes. We learn what we can, given the persons that we are and the forms for expression and the social constraints or freedoms for expression, and the knowledge that we express is, then, to some degrees, variable and situationally dependent. Management and organizational culture can learn much from selling and advertisement—processes of learning are specific to the subject. If one hopes to maximize creative expression from a given individual, one must maximize the appropriate entranceways and exits—the social situations and the cultural forms—through which the individual's development and expression may occur.

In recent years some large organizations have seen the value in encouraging and supporting "communities of practice," that is, relatively small groups of individuals interested in similar topics or work processes. These small groups come together in-person or online and discuss subjects of mutual interest that can be beneficial to the individuals involved and to the organizations to which they belong. The processes involved in meeting and in conversation and their relationship to learning have been recognized by some managers who are in charge of formal knowledge management programs. "Safe rooms" for discussion are being provided so that organizational members can have freedom of expression, the freedom to organize a community of interest (or practice) within a culture that trusts that learning will develop. Not all managers nor all organizations trust employees to this extent, however.

The chapters in this book discuss problems of process, learning, and knowledge from a variety of perspectives: critical, professional, theoretical, and applied, across a variety of organizational structures and disciplines. Mark Aakhus presents a Conversations for Reflection model that offers a method to augment and support professional expertise based on reflective inquiry and ordinary conversational practice. The model and its use illustrate knowledge as a process. Stephen Gourlay gives a remarkably broad and interesting investigation of "tacit" and "explicit" knowledge in terms of activity. Claire

McInerney and Stewart Mohr explore collaboration, learning, and trust as the basis for knowledge management within organizations. Caroline Simard and Ronald E. Rice explore best practice transfer and three barriers to it: organizational context, diffusion, and management practices. Emil Turc and Philippe Baumard investigate organizational change from the aspect of "knowledge neutralization" (unlearning, rivaling enactment, and knowledge inactivation). Jacky Swan reviews and critiques the relationship between knowledge management and innovation, according to the perspectives of production, process, and practice. Elisabeth Davenport and Keith Horton, from a social informatics perspective, investigate competing discourses or multiple versions of KM within a case study, suggesting that KM versioning is an under-explored phenomenon in studies of knowledge management. Donald Hislop's chapter examines mobile teleworkers and how their spatial mobility affects their communications and interactions with co-workers. Robert Mason also presents a model related to learning and knowledge processes. He builds on the work of Carlile where the model for learning across cultures consists of syntactic, semantic, and pragmatic levels. In his essay, Mason makes the case for librarians as central figures in knowledge management processes because of their potential as boundary spanners.

Minu Ipe's essay discusses the contributions of storytelling and conversation to sensemaking and to creating social webs in a work environment. She also makes suggestions on ways to encourage the use of storytelling and conversations in sharing knowledge in organizations, including the context of virtual, global work. Andreina Mandelli addresses sensemaking, as well, in her essay on knowledge processes in consumer communities and the negotiation of brand identity through customer-organization relationships. Another contributor, Angela Nobre, describes and discusses semiotic learning as a work methodology that encourages learning in knowledge-intensive organizations. Manuel Zacklad challenges the tacit-explicit dichotomy in his essay that connects knowing with the transactional theory of action. Finally, Ron Day presents a critique of mentalism in classic cognitive psychology and its use in Knowledge Management theory. Subsequently, he proposes a reading of indexical psychology as an alternative model. We end this volume with Day's essay that suggests an understanding of personal knowledge as hypothetical and potential knowing acts, constructed and expressed through cultural forms (such as language) in social situations.

Expression and knowledge in the processes paradigm usually relies upon action, experience, and interaction with others and with knowledge objects or forms in order for learning to take place. Communication, experience, and activity all contribute to how we know and the adaptations we make to our knowledge. Rather than the traditional notion of stores of knowledge that we hold in our mind, the view presented here is a constantly changing notion of what we know, feelings related to that knowledge, and a moreholistic

understanding of the act of knowing. The dualistic presentation of knowledge as contained in tacit and explicit categories is limited in explaining the multiple facets that comprise knowing processes.

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Contents

Conversations for Reflection:
Augmenting Transitions and Transformations in Expertise

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Abstract: The challenge of augmenting transitions and transformations through technological design is addressed here by putting forward a model of Conversations for Reflection. This model helps deal with the practical problem of helping people develop their professional expertise. The model specifies procedural conditions that support the complex communicative activity of publicly testing private assumptions, surfacing dilemmas, and publicly discussing sensitive issues. This is illustrated by showing how the model informs two interventions that augment the development of expertise. The model follows from the theory of reflective practice, current understanding of accounting behavior in interaction, and the insights and recent developments in theory and research on the Language Action Perspective. The model, its rationale, and use illustrate an approach to understanding knowledge as a process.

1 Introduction

A common workplace issue involves the development of an individual's competence to perform their work—that is, how is it that doctors, mechanics, lawyers, engineers, system designers, pharmacists, sales representatives, marketers, legislators, teachers, librarians, journalists, plumbers and so on become good at what they do? This is a pressing issue in the early stages of a person's career as she or he transitions from novice to expert practitioner. The issue does not go away as people are expected to become more effective at what they do. Furthermore, people are often challenged to transform the expertise they have developed in solving one class of problems so that it can be used to address another class of problems. While people routinely manage these

transitions and transformations in their expertise, it is no small matter for them, the organizations in which they work, or for those who use their services or products. The development of an individual's competence at performing their work raises a practical question with interesting theoretical implications for understanding knowledge processes: How can the transformations and transitions in expertise be augmented and otherwise supported through technological design?

The question at hand draws out some important matters about the relationship among knowledge, technology, and social interaction. The question downplays knowledge as an informational product acquired and managed through information seeking behavior. The question instead exposes knowledge as a process embedded in the meaning engagement practices of people (e.g., Mokros & Aakhus, 2002). An implication is that transformations and transitions in expertise might best be characterized by the cultivation of judgment not simply the acquisition of information. Knowledge is thus bound up in the practices of interaction and argumentation (e.g., Goldman, 1996; Toulmin, 1972) where people work out the truths, commitments, perspectives, and identities central to their work. Moreover, the question at hand downplays information technology as a syntactic web of interconnected information resources or even as a semantic web of information resources aligned through ontologies and rules. The question instead suggests that information technology be understood as a _____ for augmenting human meaning negotiation (de Moor, 2005; Schoop de Moor, & Dietz, 2006). Indeed, information technologies might be best understood as procedures for shaping and disciplining the interaction and argumentation constitutive of how individuals and communities develop expertise and competence. What information technology presupposes about interaction in its design is consequential for meaning engagement practice (see Aakhus & Jackson, 2005).

Any answer to the question at hand must engage with what the question opens up in terms of conventional beliefs about knowledge and technology. It is worth noting that this chapter will not use the conventional starting points for discussing knowledge and technology (e.g., tacit vs. explicit, information vs. knowledge, or information retrieval and storage). The point in doing this is to highlight conceptualization and discussion of knowledge processes. The answer to the question at hand in this chapter is answered by putting forward a model—the _____—for designing (and assessing) means to augment transformations and transitions in expertise. It is an attempt to be a demonstration of conceptualizing knowledge processes rather than just talking about what knowledge processes might be.

The Conversation for Reflection (CfR) treats expertise and the knowledge that constitutes that expertise as the artful competence of handling complexity, instability, and value-conflict when people engage in handling problematic situations.[1] The CfR brings together insights from Schön's theory of reflective

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[1] This definition is borrowed from Schön (1983)

practice (Schön, 1983) and the Language Action Perspective on Communication Modeling (Winograd & Flores, 1986; see also the April 2006 special issue of the Communications of the ACM on LAP) to address the augmentation of transitions and transformations in expertise. First, the basics of Schön's theory of the reflective practitioner and the method of reflective inquiry are introduced to frame an approach for developing expertise in work practice. Second, elements of LAP are introduced to overcome gaps in the theory of reflective practice and to lay the groundwork for a preliminary model of reflective inquiry, the CfR. Third, the CfR is explained. Finally, two implementations based on the CfR modeled are briefly described. This chapter then illustrates an approach to understanding knowledge as a process.

2 Professional Practice and Reflective Inquiry

2.1 Schön's Concern About Professional Knowledge

Schön (1983) outlines a theory of how professionals think in action that addresses a problem he finds in the conventional, technocratic conceptualization of professional practice. In the technocratic view, professional decision-making is understood to be a bureaucratic exercise where professionals resolve choices by searching for the appropriate rule within an established body of technical knowledge and then correctly applying it to the situation at hand. The professional's expertise is characterized by his or her ability to possess and apply an established body of knowledge. Professional practice applies but does not develop the basic knowledge for practice—there is a sharp divide between theory and practice.

Schön, in contrast, theorizes that professional practice is fundamentally a design process in which professionals work to turn given situations into preferred situations. From the perspective of design, professional practice involves a series of moves leading to the creation of an action, object, or plan that resolves, manages, or transforms the problematic aspects of a given situation. Professional practice is not bureaucratic rule application so much as it is a dialectical process of problem-framing and problem-solving based on the practitioner's personal theory of practice. Schön gives several examples to illustrate this from the work of planners, architects, and therapists. In so doing, he shows that professional expertise not only entails technical knowledge but also judgment—that is, the artful competence of handling complexity, instability, and value-conflict when engaging people and problematic situations. Theory and practice blend together.

Schön's concern is with the way that the traditional, technocratic view of professional expertise and action undermines the capacity for professionals to understand what they do and thus their effectiveness in doing it. The key to professional practice, then, lies in the ability of professionals to reflect-in-practice, which is reflecting while doing, and to reflect-on-practice, which is

reflecting after the doing. Schön's name for the opportunities for professionals to engage in reflection to improve their theory of practice is ⸺ . The triggering events for reflective inquiry are the dilemmas, disagreements, and conflicts professionals experience in taking action. This includes the dilemmas internal to a practitioner's understanding of the world, interpersonal conflict, and disagreement with professional and organizational norms of behavior. Improving one's practice involves not only resolving and managing dilemmas, disagreements, and conflict but in refining the habits of thought and action used in interpreting and pursuing resolution and repair of the inevitable hitches, glitches, and breakdowns in work and professional action. Reflective inquiry embraces the idea that human development is achieved in learning how to participate in different kinds of human activities.

2.2 A First Step Toward Modeling Reflective Conversations

With Schön's concern in mind, it is possible to further specify what is to be augmented and supported in addressing how professional practitioners become good at what they do. The answer being developed here, and that is implicit in the theory of the reflective practitioner, is that over time practitioners become good at the types of interactions in which they engage (at least some do). Practitioners get better at deploying their technical knowledge because they figure out how to participate in work—that is, the artful competence of handling complexity, instability and value-conflict when engaging people and problematic situations. This is due in part to repeated performance and in part to their ability to reflect-in and reflect-on their performances in work-based interactions. Learning to participate in professional practice and organizational life is not simply a problem of knowledge but of communicative skill and reasoning about communication and interaction. Participation in professional practice is thus the object of reflection and the object of design is to augment and support that reflection on practice. This requires further specification.

Schön's theory of reflective practice was pathbreaking in the way it conceptualized the communicative, interactional basis of decision-making, knowledge, and learning in professional practice. An important practical challenge for those concerned with augmenting transformations and transition in expertise, lies in creating institutions that support reflection and interactional spaces conducive to "the public testing of private assumptions, the surfacing of dilemmas, and the public discussion of sensitive issues" needed for practitioners to improve their theories of practice (Schön, 1983, p. 328). Schön provides only the broadest outline for the type of interaction central to reflective inquiry. Here is where the Language Action Perspective (LAP) on communication modeling can help by (1) enabling further specification of both the object of reflection (e.g., professional action) and the object of design (e.g., reflection on action) and by (2) providing preliminary models for

technological support that can be revised and adapted for reflective learning. In order to see how, a brief discussion of LAP basics is required.

2.3 The Language Action Perspective

Central to LAP is the idea that communicative acts, such as promising and requesting, are fundamental to work and organizational life (Winograd & Flores, 1986). Organizational action is founded on the negotiation of obligations and commitments. The negotiation takes place in the way fundamental pairs of communicative acts are worked out such as requests and promises, offers and acceptances, and reports and acknowledgements. It is in the completion of the pair of acts that organizational action is generated and consummated. For example, a request is completed by a promise, an offer is completed by an acceptance, and a report by an acknowledgement. Each of these pairs in turn generates further action. In LAP, the activity of completion is called a conversation. Much of what an organization is can be found in the resources, rules, and opportunities the organization provides (or not) for completing these basic pairs of acts. The success of an organization lies in its capacity to recognize and repair the inevitable breakdowns in conversations for action.

LAP style analysis aims to articulate and model the recurring patterns of interaction as a network of interrelated speech acts and an organization as a network of interrelated conversations. LAP style conversation analysis is a means for understanding an organization in terms of communication and recognizing that organizations are communicatively constituted (Aakhus, 2004).

In the original conceptualization of LAP, modeling interaction involves specifying the various ways in which a basic pair of communicative acts (e.g., request/promise, offer/acceptance, or report/acknowledgement), or "conversational building blocks," is completed (p. 159). The paradigm model of a conversation in LAP is the   , which is characterized by a request and its satisfaction in the promise to meet the request (p. 64). The completion of the CfA can take one of five different paths because conversations are susceptible to breakdown. Three based on the hearer who can accept, reject, or negotiate the conditions of the request. Two based on the speaker who can withdraw or modify the conditions of the request. These actions result in different states of the CfA as it moves toward completion.

Winograd and Flores take the CfA to be a primary form of interaction in organizational life. They point out that other kinds of conversations are presupposed by the CfA or follow from the CfA. So it is possible to identify and specify "networks of recurrent conversations" (p. 158) that constitute organizations and flows of work. For example, a mail order firm is built around the basic service encounter between the customer request for a product such as a baby stroller and the firm's ability to meet that request. The promise to fulfill

the request for the baby stroller is negotiated in a conversation for action where the customer and the firm's representative (e.g., person, mail order form, or wesbsite) work out how many, how much, and by when. This initiates many other conversations for action within the firm required to complete the order on time (see Goldkuhl, 2006; Lind & Goldkuhl, 2003). Thus, an organization can be modeled in terms of its network of conversations.

An area for further LAP research is the articulation of alternative forms of conversations and the networks of conversations that emerge in carrying out complex organizational processes. One alternative conversational form Winograd and Flores highlight is the "conversation for possibilities" that "open new backgrounds" for the CfA (p. 151). A conversation for possibilities is initiated through the questions "What is it possible to do?" and "What will be the domain of actions in which we engage?" and proceeds by engaging in a "continuing reinterpretation of past activity" (p. 151). This conversation is initiated by someone (e.g., a manager) who is "to be open, to listen, and to be the authority regarding what activities and commitments the network will deal with" (p. 151).

There are at least at least two important ways LAP can be used to flesh out and develop aspects of the theory of reflective practice to contribute to a theory for designing institutions for reflection. First, LAP's fundamental model, the   (CfA), defines the object of reflection and the grounds for reflective inquiry into a professional practice. Second, theory and research within LAP on modeling communication can be used to model   (CfR). The CfR model will then be used in creating procedures and technologies to support reflection on action. The first point requires further integration of LAP with the theory of Reflective Practice, which will be developed next. The second point is developed in the subsequent section.

2.4 Integrating LAP and Reflective Inquiry

The remainder of this chapter proposes, and pursues the implications of the idea, that professional practice and the fields in which professional practice takes place be understood from the orientation of LAP. The basic premise is a simple reformulation of the fundamental insight of LAP: Professional practice involves the working out of commitments and obligations associated with professional action. Professional action is constituted by basic conversations (e.g., networks of speech acts) and networks of conversations. Following from this premise, is the working assumption that in becoming good at what they do practitioners learn, and reflect upon, the recurring patterns of communicative acts—conversations—that constitute their professional and organizational actions. For instance, there may be fundamental CfAs around which practitioners' work is organized (e.g., medical consultation, the trial, the service encounter) and which implicate other conversations necessary to carry out the basic CfA. The practitioner over time comes to understand the

CfA and other conversations, how these break down, and how to repair those breakdowns. The practitioner also learns to anticipate breakdown and invoke other conversations preparatory to the CfA.

The point here is that the CfA, and other conversations already modeled within LAP, describe objects for reflective inquiry. In making transformations and transitions in expertise, practitioners develop more effective and appropriate participation including better on-the-fly prevention and repair of breakdowns. Indeed, in order to learn a practice, a practitioner learns and reflects upon:

- what counts as an initiating act and a completing act for a conversation and the variety of paths to completion for a conversation.
- how to participate in these conversations and to perform actions to bring about the preferred form of conversation.
- how different types of conversations breakdown and how to repair that breakdown.
- the networks of recurrent conversations that constitute the organization or field in which they work.
- the focal conversation for action and its preparatory or supporting conversations

Other items could be added to the list but it suffices to illustrate that professional expertise is bound up in a person's understanding of interaction and participation in their work. LAP serves as a means to articulate this important basis of the expertise involved in professional action.

While LAP research typically orients toward modeling recurrent conversations as they take place in actual conduct, it is only a small but useful step to use LAP as a means to articulate, as an object of reflection, the interactional underpinnings of practitioners' theories of practice. What is needed next is to develop an approach for modeling the reflective enterprise as a special kind of conversation—a metaconversation—about the conduct of work-life and professional practice. Such a conversation would enable reflection on the communicative and interactional underpinnings of expertise (e.g., that in the bulleted list above).

2.5 Toward a Model for Reflective Inquiry

This section explains how the integration of LAP and Reflective Inquiry described above can be modeled as a meta-conversation about the conduct of work and professional practice that will in turn surface theories of practice and thus enable reflective inquiry. LAP theory and research provides grounds for building such a model. Since the goal is to model a metaconversation, alternatives to the CfA within LAP are discussed first as a basis for modeling reflective inquiry. Recent developments in LAP theory that provide the basis for modeling a metaconversation are then discussed.

Alternatives to the CfA for Modeling Reflective Inquiry

The principle model for interaction within LAP is the Conversation for Action (CfA). The CfA models the dance between two primary uses of language first defined by Searle (1969):   , the way people use words to get others to do things, and   , the ways people commit themselves to doing things. The model specifies the network of moves involved in the interplay of requests and commissives directed toward cooperative action. The CfA does not model interaction organized around the other things that people do with their words. As Searle (1969) points out, people also perform   , by telling others how things are, and people perform   , by expressing feelings and attitudes. Assertives and expressives are important to reflective inquiry since it is through such actions that individuals, groups, organizations, and communities discover and develop the grounding for their individual and collective actions.

Interestingly enough, early theoretical developments in LAP point to additional patterns of interaction to be modeled. For example, Winograd and Flores (1986) identify the conversation for possibilities as a kind of conversation that opens new backgrounds for CfAs. Winograd (1986) also identifies conversations for clarification that anticipate and handle breakdowns in the CfA and conversations for orientation that aim to create a shared background for future CfA. These alternative models have not received as much conceptual attention as the CfA.

The conversation for orientation is particularly noteworthy in regard to modeling reflective inquiry. Winograd (1986, p. 208) explains that "in a conversation for orientation, the mood is one of creating a shared background" that includes "specific knowledge, interpersonal relations, and general attitudes." As Winograd points out, "the mood here is not directed towards action, but it is important to recognize how critical it is for people to develop shared orientation as the basis for future effective action and appropriate interpretation of language acts (p. 208)." The conversation for orientation is not specified as a model of interaction but if it were it would address what might be called the interplay of   and   in the formulation of grounds for effective and appropriate action.

Aspects of the conversation for orientation can be found in everyday organizational life, as Winograd exemplifies by referring to orientation meetings that aim to help newcomers understand what is required to function in an organization and encounters where people   or   . A full model of conversations for orientation would draw from and idealize basic interactional practices such as story-telling and accounting.

Conversations for orientation suggest a developmental purpose for some patterns of interaction that take place at work. These interactions prepare people to be full, competent actors in the conversations for action around which work is organized. Indeed, certain techniques and technologies for knowledge management, such as gIbis that captures design rationale (Conklin

and Begeman, 1988), could be understood as supporting conversations for orientation.

The conversation for orientation provides some basis for modeling reflective inquiry. It acknowledges the role of assertives and expressives and it recognizes that people surface their assumptions about how things are and their attitude toward how things ought to be. The conversation for orientation is a metaconversation about conversations for action but it is not reflective in the sense portrayed in the theory of reflective practice. As a model for reflective inquiry, the conversation for orientation has a key limitation. Reflective inquiry involves more than transmitting shared background because it involves people in actively engaging and testing their background assumptions—that is, some form of argumentation where doubt, disagreement, or opposition is expressed and managed. A real challenge for implementing reflective inquiry lies in the introduction and management of differences of opinion about conduct for the sake of better understanding conduct. A model of reflective inquiry must be able to articulate the relationship between everyday practice and meta-discussion about everyday practice.

Layers of Discourse in Modeling Reflective Inquiry

An important theoretical development in LAP is the emergence of generic, layered models of communication (e.g., Goldkuhl, 2006; Lind & Goldkuhl, 2003; Weigand & de Moor, 2004). The introduction of layers in LAP models provides a way to conceptualize the expression and management of doubt, disagreement, and opposition within the conduct of work. This has implications for modeling reflective inquiry.

Van Reijswoud (as cited in Weigand & de Moor, 2004), for example, distinguishes the success layer, which is similar to the basic CfA model, from the discussion and discourse layer. The discussion layer is what happens to correct or repair failure and breakdown in the success layer. The discussion layer draws upon the   , which is the common ground shared by parties to the activity. It could be said that the original LAP conceptualization of conversations was a flat or horizontal view of interaction while van Reijswoud introduces, or elaborates, a vertical dimension for understanding networks of acts and networks of conversations. Thus, the vertical dimension recognizes means for participants to control and regulate their interaction.

Recent work by Weigand & de Moor (2004) takes this insight even further. They model the role of argumentation in the CfA as a means for securing the relationship between communicative action and common ground. Their work shows how the interplay between directives and commissives is repaired, when it breaks down, by participants invoking relevant common ground, which includes agreements about states of affairs as well as the normative dimension of interaction (e.g., conversational roles and actor obligations).

These innovations address the complexities involved in the legitimate completion of a CfA. The innovations elaborate the basic logic of the CfA

by specifying the possibility for repair through metaconversations that fix the relevant grounding for action through argumentation. These innovations, moreover, appear to be applicable to communicative action in general and not just to the interplay of directives and commissives in the CfA. Thus, a more general and abstract theory of LAP involving generic, layered patterns of action emerge. The improvements offered by these innovations will be important in developing a model of reflective inquiry.

3 Conversations for Reflection: A Model for Reflective Inquiry

Drawing on the theory of reflective practice and the insights and recent developments in LAP theory and research discussed above, this section proposes, albeit in preliminary form, the   (CfR) model. The CfR is a model from which procedures and technologies can be developed (and assessed) for supporting reflective inquiry on theories of professional practice. The model specifies procedural conditions that support the public testing of private assumptions, the surfacing of dilemmas, and the public discussion of sensitive issues. The model outlines the network of communicative acts for participants to engage each other in a way that enables reflection on practice with the goal of improving their theories of practice. However, the model is not built solely from the abstract outlines of LAP and the normative goals of Reflective Inquiry. The model is grounded in what is known about accounting and disagreeing in ordinary interaction. Thus, the CfR model draws upon routine, ordinary behavior and proposes how to re-design it in order to achieve the normative ends outlined in the theory of reflective practice (see Aakhus & Jackson, 2004, for related discussion about designing discourse).

3.1 Accounting Sequences as a Basis for Reflective Inquiry

Reflective inquiry is understood here as an idealized view of what we ordinarily experience in interaction as accounting. Using accounting as the ordinary practice to model Reflective Inquiry is relevant because accounts are undertaken in the context of problematic events. The classic distinction is that some accounts are   while others are   (Scott & Lyman, 1968). Excuses admit that an act was bad but deny that the speaker had full responsibility while justifications accept full responsibility for an action but deny or minimize its presumed badness. When accounting a person engages in the broader activities of reason giving and explaining and, as Tracy (2002, p. 79) points out, accounts are highly rhetorical in that "they are speech acts crafted to accomplish the interactional goal of being seen as reasonable." Thus, accounts mark what the accounter takes to be reasonable and what

the account-recipient assesses to be reasonable and in so doing highlights important collective commitments.

The ordinary activity of accounting involves at least two participants. One person, the accounter, puts forward an account to another with the aim that it will be accepted. The completion of an accounting sequence happens when the account is accepted, which is a relevant and preferred second part to the account, or when the account is rejected, which is a relevant but dispreferred second part to the account (e.g., Pomerantz, 1978). The completion of the sequence breaks down when the felicity conditions for an account do not hold, such as when the account is not seen to be relevant, is produced for the wrong listener, when its veracity is questionable, when the account invokes faulty assumptions, or when the speaker's sincerity or motive in issuing the account is questionable. These are all matters to which the person offering the account can be held accountable and which lead to different paths for completing the account sequence (see Aakhus, 2004, for related discussion).

In everyday interaction there is often a ⎷   in accounting sequences. That is accounts are designed to be acceptable and responses to accounts are designed to heighten the possibility for the account being accepted (Pomerantz, 1978). The preference for agreement subdues, downplays, and glosses over the expression or expansion of doubt, disagreement, and opposition that could arise over the performance of the account. This happens for example when accounts are produced in the shortest possible version with the least amount of details on which one could be challenged. It also happens when response to accounts downplay what is doubtful or disagreeable.

The CfR model promotes critical reflection on practice by preserving some features of how accounting sequences unfold while designing out other features.

3.2 The CfR Model

The CfR models conversation intended to lead participants to insight into their theory of practice by surfacing or drawing into attention consequences of their theoretical orientation that were previously taken for granted and not understood. The CfR model is a general model meant to guide the development of institutions and interactional spaces for reflection. It is a model not a literal representation. As such, it is partially descriptive about how reflective conversations work and partially normative about how reflective conversations ought to work. It is useful because it can be used to assess practical circumstances to create procedures, techniques, and technologies to realize a CfR in a practical circumstance.

It should be noted that CfR emphasize reflection-on-action not reflection-in-action. Reflection-on-action enables participants to take stock of how the way they account for troubles and frame troubles through stories orients and blinds their thinking and acting. There will always be a gap between what one

knows in performing an action and the description of that action. According to Schön (1983), this is not a problem for reflective inquiry but an opportunity since even incomplete and inadequate descriptions of intuitions often provide enough material for critiquing and restructuring intuitive understanding to produce new actions or framings of what is problematic (pp. 276–277).

The CfR model only partially resembles naturally occurring accounting activity. The most obvious difference between the CfR and ordinary accounting is that the CfR attempts to design out the preference for agreement by fostering breakdown in the accounting sequence. The primary feature of the CfR model is an account-opposition sequence, which defines the primary pair of acts (see Fig. 1). The first move is an account where a person reconstructs an event by portraying what happened, what was problematic, and what the event signifies. It is important that the accounter take on certain obligations in producing an account. The accounter is expected to articulate their experience with enough clarity that recipients get some sense of having been there and
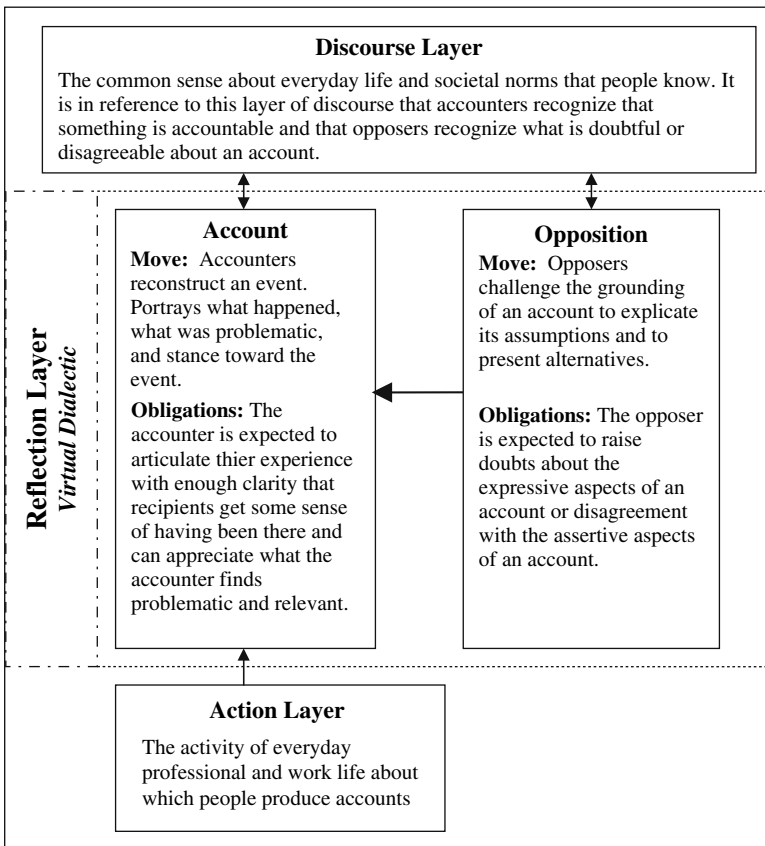

Fig. 1. Conversation for Reflection

can appreciate what the accounter finds problematic and relevant. Accounts ordinarily seek acknowledgement of what has been expressed and acceptance of what has been asserted. However, to promote reflection accounts need to be made accountable and thus the CfA outlines an alternative to the ordinary completion of the accounting sequence. Thus, the second basic move is .... The point is not to be antagonistic and hostile but instead to make the account engage with doubt or disagreement. The CfR withholds the conditionally relevant, preferred response to an account and promotes opposition. The CfR highlights the role of opposition to make explicit what an account presumes by challenging what is asserted and raising doubts about what is expressed with an account. The opposer is obligated to raise doubts about the expressive aspects of an account or disagreement with the assertive aspects of an account. That disruption helps generate material for reflection and engagement with the grounding of actions.

The account-opposition sequence is the primary part of a metaconversation embedded between two other layers of communication. One layer is the action layer which is the activity of everyday life about which people produce accounts. It is similar to the success layer in van Reijswoud's model. However, the CfR is not a model of reflection-in-action but a model of a metaconversation where there is reflection-on-action so CfRs begin with accounts about something that has happened. The participants then engage in a reflection layer, or ...., about what has happened. This layer is similar to the discussion or argumentation layer in other models. The other layer is a discourse layer, which as in other models, is the common sense about everyday life and social norms that people know. It is in reference to this layer of discourse that accounters recognize that something is accountable and that opposers recognize what is doubtful or disagreeable about an account.

4 Designing Support for CFR

Since reflective inquiry may not happen of its own accord or be implemented in social-psychological or socio-political conditions conducive to its conduct, it is necessary to develop procedures, techniques, and technologies that can help people produce reflective inquiry. This section discusses some general issues in developing support for reflective inquiry and briefly describes some specific applications inspired by the CfR.

4.1 Micro and Macro Support for Reflective Inquiry

The CfR highlights two classes of communication support required for Reflective Inquiry. Micro-support focuses on enabling the basic account-opposition interaction to happen. Macro-support focuses on capturing and re-representing the products of the account-opposition interaction for further use.

Micro-Support of Reflective Inquiry

The generative feature of the CfR for reflective inquiry is the dialectical pairing of accounts with opposition. The CfR spells out what should happen in these moves. Micro-support is the design of procedures, techniques, and technologies that function like tools or props for making the moves through which people construct reflective inquiry. Micro-support opportunities lie in the guidance a tool provides for focusing accounts and opposition (see Fig. 2). In general, micro-support for accounts should help the participant provide the fullest account possible of what happened. This includes expressions of attitudes and background assumptions/beliefs. More specifically, micro-support will vary depending on the professional practice, whether the participants are novices or experts, and the learning goals for the setting.

It should be remembered that accounts highlight and hide aspects of the state of affairs described and reveal and conceal feelings and attitudes about those states of affairs. In general, oppositional moves should draw unexpressed premises into relief and maximize the expression of doubt or disagreement over what is said. Micro-support for oppositional moves should help make the expression of doubt and disagreement relevant to the account made. In addition, oppositional moves should help make explicit the common sense and social norms brought to bear in expressing doubt and disagreement.
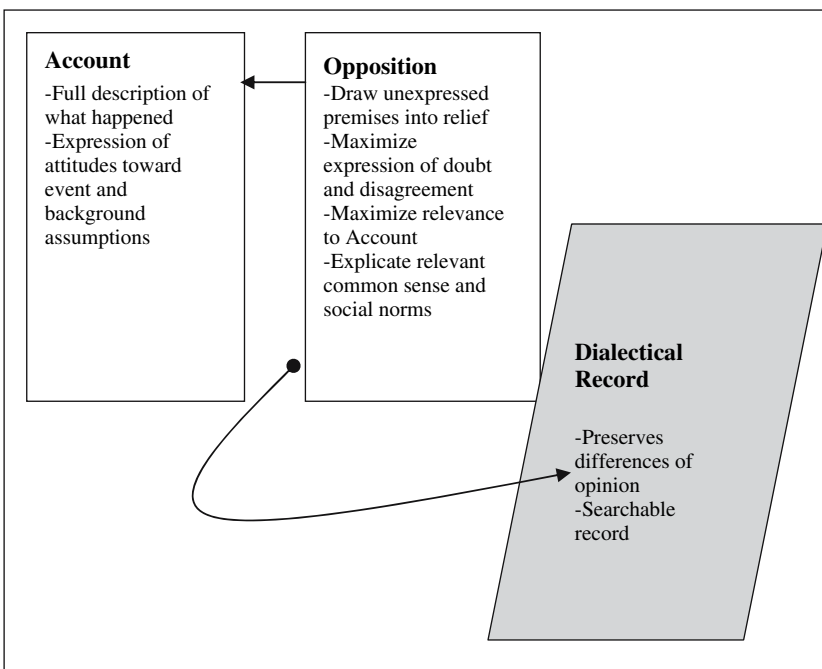

Fig. 2. General Support for Reflective Inquiry

Macro-Support of Reflective Inquiry

The CfR model incorporates macro-features of reflective inquiry (see Fig. 2). The purpose of the account-opposition dialectic is to surface assumptions for testing and critique. The product of the virtual dialectic is a   of accounts and opposition—that is, if this is captured and articulated. Macro-support for reflective inquiry should provide a mechanism to record the accounts and oppositions. First, capacity to search the record provides another form of interactivity that can promote individual and collective inquiry into the grounding of action in a group, organization, or community. In particular, participation at this level should promote searches for evidence to disconfirm given orientations toward action available in the group, organization, or community. Second, the accumulation of accounts in a dialectical record provides a basis for identifying patterns of accounting and opposing. These patterns may be evident in surface linguistic features such as particular phrases or forms of expression. These patterns may also be implicit and index tacit assumptions difficult to detect in one or two responses but more easily detected in a large corpus of responses. These assumptions can be summarized and presented back to the participants in the CfR to further expand the reflective inquiry being supported.

The building of the dialectical record does not suppress the differences articulated in the virtual dialectic. This is consequential for aiding reflection on theories of practice in at least two ways. First, it provides a resource for individuals to encounter differences and engage their own perspective of practice. Second, when the record and its production are made into an object of reflection, it is possible to examine how the collective reasons about communication and interaction in work and professional life. For instance, after repeated participation in a CfR it may become apparent that novices have particular ways of understanding, or ways of describing and framing, an aspect of practice. This understanding may differ markedly from how expert-practitioners conduct themselves. The macro-support can then provide an opportunity for deeper, critical reflection on practice and specific cases for the novices to work from.

Designs Based on the CfR

This application was motivated to solve the practical problem of guiding students in workplace internships to reflect on their work experiences. At one level, the situation presents a problem of providing a discourse space for students who cannot otherwise meet their instructor or classmates face-to-face. At another level, the situation presents problems of discourse that students would face even when meeting face to face such as coherent production of accounts, time to receive adequate feedback, preference for

agreement, and conflict avoidance. Electronic media were used as a resource for restructuring interaction to address these problems. The CfR provided a guide to designing the application (for additional discussion of the application see Aakhus, 2001).

The account-opposition sequence in this setting was designed to help the students focus on surfacing and testing their assumptions about the role of communication in work and professional life (see Fig. 3). The accounting took the form of an   focused on describing a dilemma the intern experienced at work. The update contained several questions encouraging elaboration of the dilemma, how others might handle the situation, and what the intern learned from the situation. The opposition was designed as a response to the update. The response contained several questions encouraging participants to raise doubts about specific points in the updates. The application also enabled the building of a dialectical record that is searchable.

Several alternatives on this format have been developed and implemented. These alternatives emphasized a slightly different focus by encouraging interns, for example, to report important moments where their speaking rose to the demands of the situation or failed to. The responses have also been re-organized to encourage opposers to first summarize an update before expressing doubt or disagreement with the update.
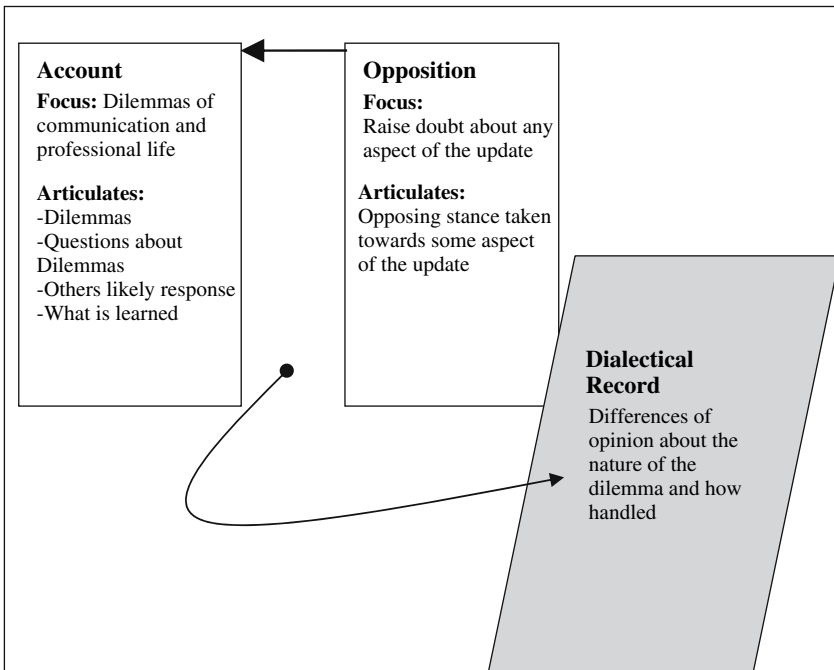
Fig. 3. Support for Dilemmas of Communication CfR

The application contributed to a marked improvement in the narratives interns constructed about themselves as budding professionals and their expertise. Prior to the implementation of the virtual dialectic, the interns' portfolios focused almost exclusively on the image of the organization where they interned. After implementing the virtual dialectic, the interns portfolios clearly focused on their development and understanding of communication at work and in professional life. This enabled them to produce much better accounts of their strengths, abilities, and direction for their career. In addition, preliminary analysis of the discourse of the participants suggests that there may be ways to articulate patterns of communal reasoning about a topic and thus to create interventions that shape how community reflects upon a domain (Aakhus, 2001; 2003).

Difficult Conversations Experienced in Medical Clerkships

This application is used by third year medical students going through their clerkship, "which is a rotation of field experiences in different medical settings. Medical students observe and experience many difficult conversations during their clerkships. The way medical students make sense of what they observe or do in these difficult conversations is consequential for how they come to understand medical practice and their own subsequent behavior. Yet, the
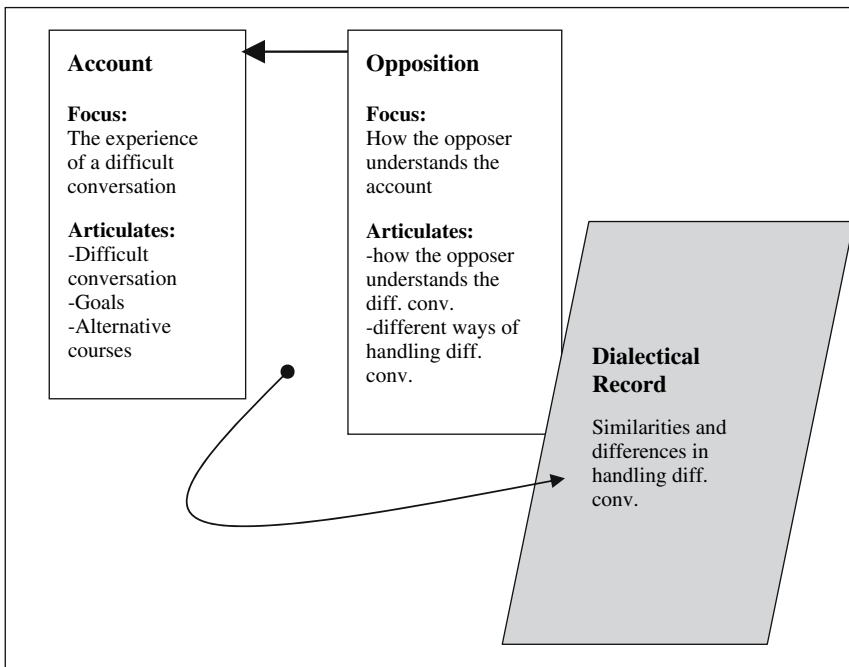

Fig. 4. Support for the Difficult Conversations CfA

opportunities for discussion and guidance regarding these situations tend to be haphazard. So, an application based on the CfR was developed that enabled the medical students to reflect on difficult conversations (for further discussion see Makoul, Aakhus, Altman, & Flores, 2004).

A key issue in designing and implementing the application was constructing a safe-space for the medical students to discuss these difficult conversations (see Fig. 4). The accounting took the form of posts asking students to describe the difficult conversation and the ways in which it went well and did not go well. The opposing took the form of responses asking how the opposer would have handled the situation and whether it was similar to any experience of the opposer. Students reported that the DC Forum was easy to navigate and valuable. It is now seen as part of the curriculum, not an add-on. The DC Forum is filling a void by facilitating reflection and dialog about communication challenges.

5 Conclusion

This chapter presents a model of the Conversation for Reflection and examples of its implementation. The model solves a conceptual gap in building institutions for reflection and supporting reflective inquiry. The CfR is a conceptual tool to be used in designing micro and macro support for reflective inquiry on professional practice. Thus, the CfR model helps address how to augment and support transformations and transitions in expertise. The CfR draws upon the theory of reflective practice, research and theory on the Language Action Perspective, and research and theory on ordinary conversational practice. Additional conceptual work is needed to further develop the theory of argumentation underlying the reflective discussion layer—virtual dialectic—and to further specify the social-psychological conditions and socio-political conditions conducive to reflective inquiry. Moreover, additional empirical research on the use and effectiveness of applications based on the CfR is needed to develop a more comprehensive approach to supporting reflective inquiry.

It is worth noting that the approach to knowledge taken here did not make explicit the common starting points for much the contemporary discussion of knowledge management: tacit vs. explicit knowledge, information vs. knowledge, and information retrieval and storage. These are obviously important points and very practical matters, yet framing problems of knowledge in these conventional terms glosses over the interactional and communicative foundations of knowledge. To discuss . . . . this chapter highlights meaning engagement practices and information technologies as a pragmatic web for augmenting human meaning negotiation. Indeed, developing something like the CfR does not begin by asking how to build data structures, how to organize a data repository, or on how to search a given database. These are obviously questions of great practical import

and theoretical concern. Yet, developing something like the CfR and practical implementations of it begins by asking what meanings people pursue, what commitments and obligations people manage, what routine, ordinary forms of communicative acts people perform, and how technology can become a tool for interacting.

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An Activity Centered Framework for Knowledge Management

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Abstract: Knowledge management theory and practice is dominated by two over-arching concepts: tacit and explicit knowledge. It is argued in this chapter that tacit knowledge is poorly conceptualized, and applied to disparate phenomena. Other disciplines testifying to action without awareness manage without invoking tacit knowledge, a course of action advocated here. Explicit knowledge is typically treated as unproblematic, an assumption challenged here by exploration of some issues in knowledge transfer, and with reference to reading research. Knowledge itself is admittedly a difficult concept, but it is argued that in all this we are in effect concerned with two types of activity: routine activity on the one hand, and reflective activity on the other. The chief characteristics of each are indicated, and a framework showing their inter-relations is outlined that helps draw together important aspects of knowledge management's concerns.

1 Introduction

Knowledge management discourse is dominated by the assumption that knowledge is of two types, tacit and explicit, and that the relation between them is of critical importance. It is widely acknowledged that tacit knowledge is poorly conceptualized, as will be shown in detail below, and that knowledge, the principal object of knowledge management, is difficult to define satisfactorily. However, knowledge management discourse appears not to regard explicit knowledge as a problematic concept.

A number of important conceptual, and thus practical, problems hinder development of knowledge management as a discipline, and as an arena of efficacious practical application for organizations, not to mention the wider "knowledge society." Debate and evidence concerning tacit knowledge will be reviewed, and I will develop an argument to suggest it is no longer, if it ever was, a useful concept. Explicit knowledge too will be examined in more than usual detail: it is a more complex concept than has been recognized. Knowledge remains a difficult notion and I will argue we need at least to try to combine the object and process views instead of favoring one over

the other. In concluding the essay a framework focusing on types of activity, which incorporates all the phenomena of tacit and explicit knowledge, will be outlined, and its implications discussed.

2 Tacit Knowledge

It is widely agreed that tacit knowledge is important if not critical to organizations and to the theory and practice of knowledge management. It is said to be the source of new knowledge in organizations (Nonaka & Takeuchi, 1995); the basis of expertise, and critical both to daily management and as a firm's source of competitive advantage (Baumard, 1999; Spender 1996, Ambrosini & Bowman 2001; Johannessen, Olaisen & Olsen, 2001; Berman, Down & Hill, 2002; Lubit, 2001; Marwick, 2001). Beyond knowledge management and business studies, Collins has shown that tacit knowledge is critical to scientific experiments (Collins 2001a, b) and he along with many others regard tacit knowledge as fundamental to all human knowing and knowledge. All the same, it is also claimed that the concept is difficult to operationalize, and carries too many meanings (Ambrosini & Bowman, 2001; Spender, 1996; Leonard & Sensiper, 1998). More strongly worded criticisms suggest that it has become "unproductively amorphous" through widespread and uncritical use (Cowan, David & Foray, 2000, p. 213); that it has led to "mystification and magification" (Donaldson, 2001, p. 955) and that it is "explanatorily empty" (Pleasants, 1996, p. 249).

Knowledge management and organizational studies' literature certainly provides evidence of conceptual confusion and even apparent contradiction. While many authors regard tacit knowledge as personal, private knowledge, thus appropriately treated only at the individual level (Johannessen et al. 2001; Ambrosini and Bowman, 2001; Boiral, 2002) others claim it is a property of groups or collectives manifested in organizational routines, procedures and the like (Colis, 1996; Spender, 1996; Johannessen et al. 2001; Nelson and Winter, 1982; Leonard and Sensiper, 1998). Collins' (2001b) suggestion that fully tacit knowledge is only manifested in the "forms of life" of a group also indicates a collective notion. While all these authors see tacit knowledge as implicated in human activities, Grant and Gregory (1997) suggest that it can be found in test equipment.

Regarding individuals, there is general agreement that tacit knowledge is acquired through direct experience of what the tacit knowledge concerns through, for example, on the job training and informal learning at work (Marchant and Robinson, 1999; Patel, Arocha & Kaufman, 1999; Herbig, Büssing & Ewart, 2001; Wagner, Sujan, J., Sujan, M., Rashotte & Sternberg, 1999). On the other hand, others argue that we are biologically predisposed toward certain aspects or kinds of tacit knowledge, suggesting experience is not necessarily a factor (Torff, 1999; Patel et al. 1999). Horvath and colleagues (Horvath et al. 1999) appear to be in a minority when they say tacit knowledge

is acquired with little help from others as there is widespread agreement that personal contact with and observation of others are critical factors in its acquisition (Collins 2001a, b; Leonard & Sensiper, 1998). It is unclear what "personal contact" means but some accounts suggest a complex iterative process of working with whatever is being transformed alongside experts in the field thus being able to imitate and to receive feedback from them (Cook & Brown 1999; see also Collins, 2001a).

There are also important differences over the function or effects of tacit knowledge. On the whole it is suggested these are beneficial—tacit knowledge is said to be essential for competent performance in concrete situations (Wagner et al. 1999; Wagner & Sternberg, 1986), enabling individuals to deal with new situations, to fill in the gaps in formal training (Horvath et al. 1999; Marchant & Robinson, 1999; Argyris, 1999; Collins, 2001a, b) and to act quickly without having to deliberate (Josefson, 1988; Herbig et al. 2001; Wagner et al. 1999). The latter virtue in particular could also be a vice: Argyris (1999) suggested that tacit knowledge has a contradictory duality being not only the basis of successful management but also of defensive routines. Research into medical practice has also noted that tacit knowledge sometimes contains naïve and wrong theories (Herbig et al. 2001; Borrell-Carrió & Epstein, 2004). Similarly, while it is claimed that tacit knowledge is an important source of sustained competitive advantage (Ambrosini & Bowman, 2001; Baumard, 1999) in so far as it is manifested in traditions it is a conservative rather than an innovative force (Johannessen et al. 2001). Of course, it may be   it is conservative and tradition-bound that it can be a source of sustainable competitive advantage precisely because traditions cannot easily be copied.

Finally, there has been much debate about the relationship between tacit and explicit knowledge, particularly following Nonaka and Takeuchi's (1995) thesis about knowledge creation. Some aver that tacit knowledge is by definition non-verbal, inarticulable, unconscious, or ineffable (Patel et al. 1999; Collins, 2001a; Ambrosini & Bowman, 2001; Herbig & Büssing, 2003; Tsoukas, 2003). On the other hand, others say is it rarely expressed, or difficult to express or simply assume that it can be made explicit. Difficulties include the fact that it is by definition personal and context based, that the holder might stand to lose by making it explicit, and that explication requires a supportive environment involving trust and appropriate organizational structures (Torff, 1999; Boiral, 2002; Spender, 1996; Nonaka & Takeuchi, 1995, Wagner & Sternberg, 1985, 1986).

Perhaps tacit knowledge's very ineffability prevents us from understanding that it is a multi-faceted apparently contradictory phenomenon! A more likely explanation is that, as Cowan and his colleagues (2000) have suggested, is that uncritical use of the term has led to this sea of confusion, while at the same time the criticality of tacit knowledge to organizational functioning, if not social life in general, is asserted. One probable reason for this state

of affairs is the lack of theory to guide our empirical work, a claim which requires some justification.

2.1 Tacit Knowledge—The Lack of Theory

Polanyi's authority for the concept is regularly noted in knowledge management literature, particularly by citation of   (1966). Polanyi certainly used the phrase, but attributed quite a different meaning to it than that expressed or implied in knowledge management literature. Polanyi did   mean a form of knowledge that is tacit, but a process of   . At one point he even wrote that knowledge "is an activity which would better be described as a process of knowing" (Polanyi, 1969a, p. 132), and it is clear that by "tacit knowledge" he meant a process and not a form of knowledge.

Polanyi's argument rests on the part-whole model of perception whereby we perceive wholes by integrating the parts of which they are composed, a widespread notion (Pleasants, 1996; Gregory, 1984, pp. 362–6; Reed, 1997). To explain this Polanyi postulated that humans possess special powers by which such integration is achieved, powers he called "tacit knowing":

> a scientific discovery reduces our focal awareness of observations into a subsidiary awareness of them, by shifting our attention from them to their theoretical coherence. This act of integration, which we can identify both in the visual perception of objects and in the discovery of scientific theories is the tacit power we have been looking for. I shall call it tacit knowing. (Polanyi, 1969b, p. 140).

Polanyi further claimed that this process underpinned virtually the whole of human action, which thus depends on tacit knowing (Gourlay, 2004a; Tsoukas, 2003).

In so far as a process gives rise to an outcome it might be argued tacit knowing would result in tacit knowledge. However attractive this idea might be to those wishing to find theoretical support for the term in Polanyi's writings, it would be inconsistent with his argument. For Polanyi, tacit knowing results in the perception of "phenomenal qualities of external objects" (1969b, p. 153), and more generally, the "understanding of the comprehensive entity" constituted by the process (1966, p. 13). Tacit knowing results in "understanding," in a feeling, and not in a form of knowledge.

On the other hand, it might not be inconsistent with his ideas to regard the parts known tacitly when perceiving a whole as tacit knowledge. This would entail abandoning the notion that tacit knowledge cannot be made explicit, which some regard as definitional (e.g., Tsoukas, 2003) because, as Polanyi himself admitted, the parts of a whole can be known explicitly (1966, pp. 18–20; 1969c, p. 204). Indeed, in one of his last papers (1968, p. 32) Polanyi wrote that only the "sensory quality which conveys" the content of "an integration" must remain tacit, suggesting a further retreat from any strong claim about inherently tacit knowledge.

While Polanyi himself appears to have begun to abandon an allegedly defining feature of tacit knowledge toward the end of his life, thus undermining use of his authority for the concept, a more fundamental difficulty is that to accept his theory entails accepting the part-whole model of perception. In its modern form, this appears due to Helmholtz' theory of unconscious inference (Fraisse, 1968), the influence of which Polanyi acknowledged (Polanyi, 1968, 1969d). Although this assumption continues to inform the psychology of perception (Latimer & Stevens, 1997; Turvey & Shaw, 1999) it has also been questioned. The counter-argument is that parts are identified after wholes have been perceived or noticed (Dewey, 1930; Bartlett, 1932) and on these grounds ecological psychologists have provided alternative models (Turvey & Shaw, 1999; Burke, 1994). If the fundamental grounds on which Polanyi's argument stands are questionable on logical, empirical, and theoretical grounds, it would seem better to start elsewhere.

Wittgenstein is regarded by some as a more significant source of support for the notion of tacit knowledge than Polanyi (Collins, 1974; Johannessen, 1988; Janik, 1988; Tsoukas & Vladimirou, 2001; Tsoukas, 2003). Janik (1988), following Wittgenstein, argued that there are two forms of tacit knowledge in the strong sense of knowledge that   be expressed in words. One is knowledge by acquaintance or familiarity: we know what coffee smells like, or how a musical instrument sounds, only by experiencing the sensations as this knowledge cannot be expressed in words. The other involves the "open-textured character of rule-following" (Janik, 1988, p. 56).

The rule-following argument is probably the central theme of Wittgenstein's that informed the notion of tacit knowledge (Pleasants, 1996). Janik argued that what is critical here is constitutive rules—"the sort of rule-following activity through which we learn to how to perform a specific sort of action in the first place," rather than regulative rules (Janik, 1988, p. 57). Regulative rules can be set down, unlike constitutive rules. This distinction is important because the "rules-regress" problem (rules cannot contain the rules for their own application, hence there is logically an infinite regress to specifying rules) is often cited to substantiate the notion of tacit knowledge (e.g., Collins, 2001b) but applies to regulative rather than constitutive rules.

Knowledge by acquaintance receives little or no mention in knowledge management literature unlike the rule-following argument. Collins (2001b), however, focused on Wittgenstein's notion of "forms of life," arguing that it alone provided the strongest support for the idea of tacit knowledge. "Forms of life," are the basic assumptions that people in different social groups take for granted about themselves and their lives. He argued:

> If it is the case that the true sources of our beliefs are in large part the social contexts we inhabit, yet we think that the sources of our beliefs (including beliefs about the natural world), are something else, then the sources of our beliefs are hidden from us. Our beliefs, then, are based on tacit understandings. (Collins, 2001b, p. 111).

Tsoukas and Vladimirou (2001) argue that the capacity for individual action lies in such collectively generated forms of life, and thus that Wittgenstein's distinctive contribution to the debate is the idea that all knowledge, including tacit knowledge, is collective.

Were students of Wittgenstein agreed on his contribution these ideas might form an alternative source of relevant theory. However, Schatzki (1996) for one cautions strongly against relying on the notion of "forms of life" saying that Wittgenstein uses the term in a colloquial fashion to mean something like a way of living, but when the concept is probed more deeply it appears ambiguous and imprecise. A more sweeping attack on the conventional interpretation of Wittgenstein was made by Pleasants who argued that people are "wholly mistaken" (1996, p. 235) to see tacit knowledge as a central component of Wittgenstein's analysis of rule-following. Indeed, Pleasants argued that in his later works Wittgenstein was in fact strongly opposed to postulating mentalistic things like tacit knowledge to account for behavior contending that practices are ... underlain by any hidden structure of tacit rules, or individual tacit knowledge. In view of such fundamental differences among scholars, it would appear unwise to build a theory of tacit knowledge on Wittgenstein's ideas.

While others have drawn on Hayek in support of the idea of tacit knowledge (Desrochers, 2001; Oguz, 2000) it does not appear that he offered a more coherent account. We are left with the notion that our non-verbal (or non-verbalizable) actions are underpinned by a form of knowledge that is, or may be, wholly or partly inarticulable, practical constraints such as costs notwithstanding. We lack theory as to how and why this should be the case, unless we fall back on the notion of unconscious inference, and thus lack a secure framework for empirical observations and research. If there is no theory perhaps we can detect a consistent pattern to some of the empirical phenomena to which the phrase has been applied. The differences noted above were largely generalizations about tacit knowledge, and it is possible that there is more consistency in the detailed application of the term.

2.2 What Does "Tacit Knowledge" Indicate?

A recent review of individual level phenomena to which the phrase "tacit knowledge" was applied found it had been used in at least six distinct ways (Gourlay, 2004b). If we are to use the phrase in a way at least consistent with the meaning of "tacit" then we should exclude situations where people clearly could verbalize their knowledge. Trade secrets, craft knowledge, and general presuppositions about everyday life have been called tacit knowledge (Janik, 1988) but these can all be made explicit. Similarly, a factory foreman's ability to know that statutory dust emission levels were being exceeded when he could no longer see a clock across the factory, or workers' knowledge of butane leaks (Boiral, 2002) hardly count as tacit knowledge since they too could be explicitly stated with little difficulty. In examples like these it appears there is

no question of . . .   to tell, only that telling was restricted to certain social groups, or just had not been required.

A different problem concerns tacit knowledge "manifested . . . in traditions" (Collins, 2001b, p. 113; see also Collins, 1974, 2001a). For example, scientists were unaware that aspects of their experimental set-up they assumed were of marginal significance critically affected the results, and so they did not report them. When others could not replicate their results this led to experimentation with the techniques as a result of which critical differences between different teams' experimental set-ups were revealed. To suggest that the first team tacitly knew what they were plainly ignorant of stretches the meaning of "tacit knowledge" beyond utility. The very first humans must have tacitly known the earth moves around the sun even if they persisted in explicitly stating the opposite for centuries! Invoking "tacit knowledge" in this context rests on the assumption that human actions are underpinned by knowledge, and if something that actors were unaware of can be shown to be critical to actions, then that something was tacitly known. The term is thus widened to include all things of which actors are ignorant, but which, on inspection and analysis, can be shown to have contributed to an action.

More often, and more justifiably, we find use concerns situations where people can do something, but   . tell, explain, or put it into words how they do it. Examples include expert lawyers' rapid but effective perusal of case documents (Marchant & Robinson, 1999); salesmen's ability to make a sale and to maximize potentially profitable situations (Wagner et al. 1999); being able to ride a bicycle, speak a language, and make tasty bread (Cook & Brown, 1999; Collins, 2001b; Nonaka & Takeuchi, 1995). Josefson's (1988, pp. 26–7) account of a nurse who felt something was wrong with a post-operative patient who later died of complications, despite the doctor having declared there was no cause for alarm, also seems to conform to this pattern.

In these cases it seems that the actors could not explain their judgments, which led the observers to attribute it to tacit knowledge. We also find examples of behavior in which tacit knowledge is invoked as an explanatory factor by observers, but which clearly concerned knowledge that was originally learned explicitly. This is typical of situations involving expertise. Thus medical experts' highly structured biomedical knowledge base developed through formal training, and exercised in many contexts, has over time become unconsciously and automatically applied (Patel et al. 1999; André, Borgquist, Foldevi, & Mölstad, 2002). Unlike in the previous examples, this knowledge can be made explicit by the actors, if, for example, a diagnosis is questioned. Other instances of the exercise of expertise, such as the lawyers, might also fit this category.

So far tacit knowledge has been acquired doing the corresponding activity, or was learned explicitly but has become automatically exercised. The phrase has also been used for knowledge acquired independently of the activity it influences. Collins (2001b, pp. 108–112) suggested that skills such as dancing, or riding a bicycle, are underpinned by knowledge that is tacit "because of

the way we are made," implying an innate source. Torff (1999, p. 195) noted that trainee teachers entered training with a "tacit and intuitive" notion of pedagogy that resisted efforts to change it which he claimed was due partly to innate predispositions. He also suggested that trainee teachers were influenced by folk psychological notions of pedagogy, thus pointing to yet another sense in which tacit knowledge is used—knowledge due to culture that tacitly affects behaviors (see also Spender, 1996, p. 62; Baumard, 1999, pp. 119–38, 155–175).

In all the examples so far, tacit knowledge has been inferred by observers of actions completed by others. The phrase has also been used where the actors claimed that tacit knowledge was involved but no action could be observed. Ichijo, von Krogh, and Nonaka (1998) quote Japanese managers' claims that communication of their business plans depended on tacit knowledge:

> Our business plans come from our heart. Even if the plan's presentation is clumsy, it is highly evaluated if it contains a certain belief. While I am reading it, such a belief is emerging in my mind. Something envisioned in the domain of their tacit knowledge must be accepted in the domain of our tacit knowledge.... (senior manager, quoted by Ichijo et al. 1998, p. 184).

In the absence of an observable action we are left with a claim about feelings. Such a case could be investigated empirically by, for example, using techniques like repertory grid or cognitive mapping (Huff, 1990; Jankowitz, 2001) to create representations of the planners' unconscious beliefs, and an experimental research design to see if plan readers' unconscious perspectives change toward those of the plan writers after reading the "clumsily" presented plan. If they did, then we would have reasonable grounds for accepting such examples as further instances of tacit knowledge. Until such time however, it seems better to treat such statements simply as subjective claims, and to exclude them from further consideration.

For the present it is evident that there is a broad class of observable actions in respect of which the actors cannot articulate the underpinning knowledge—which we can reasonably and consistently call tacit knowledge. This usage is consistent with a loose reading of Polanyi who generally also uses examples of observable actions in his discussion of tacit knowledge/knowing. It would seem better, in the interests of clear communication if nothing else, not to use the phrase where people can articulate their knowledge, or where the claim concerns unobservable behaviors.

2.3 Explaining Tacit Knowledge Phenomena

When Polanyi, Wittgenstein, and Hayek were writing the idea that people could unconsciously acquire the ability to do something that they could not articulate was not well accepted. Perception without awareness had been known since at least the early 20th century, but methodological difficulties in studying it prevented it from being taken seriously

(Reber, 1993). Subsequently considerable evidence has been amassed for the scale and importance of unconscious abilities and learning (Berry & Dienes, 1993; Bargh & Chartrand, 1999; Frith & Wolpert, 2004; Stadler & Frensch, 1998) which could substantiate claims about tacit knowledge, and which indicate that what we observe is the effects of neurological processes characteristic of an organism in its environment over which we have no conscious control.

Almost any discussion of tacit knowledge cites riding a bicycle implicitly or explicitly following Polanyi's example (1962, pp. 49–50). Until recently, however, (Gourlay, 2005) no one looked at research into motor skills to see how that might inform knowledge management debate. If explanations of motor skills depend crucially on the postulated, or better still, demonstrable, existence of a form of knowledge that is tacit, then we would have strong grounds in continuing to hold to the thesis of tacit knowledge. If not, then we must question if not set the assumption aside.

Modern research into human motor skills dates from the 1950s (Pew & Rosenbaum, 1988) and until the 1980s it would have been easy to conclude that this research lent clear support to the notion of tacit knowledge. At that time there were several competing theories of motor behavior but all were information-processing theories (Abernethy & Sparrow, 1992). These view organisms as working in ways analogous to a computer: meaningless input stimuli are converted unconsciously into meaningful representations that then guide movement. Representations are internalized program-like knowledge structures recording movements (Williams, A. M. Davids, Burwitz, & Williams, J. G., 1992; Williams, A. M., Davids, & Williams, J. G., 1999; Handford, Davids, Bennett, & Hutton, 1997; Pew & Rosenbaum, 1988; Meijer, 1988, quoted in Williams et al. 1992, p. 165).

In so far as the content of these internal knowledge structures was tacit, information processing models thus provide support for the idea of tacit knowledge. Indeed, the similarities between these models and Polanyi's arguments are remarkable, indicating his theory belongs to the broad category of information processing models. Some motor skills researchers did refer to tacit knowledge in the context of motor skills research (e.g., Blais, 1993; Williams et al. 1999), but they are the exception. Most researchers in this field manage quite well without it.

Powerful though the information-processing approach was one particularly intractable difficulty was the degrees of freedom problem—there are simply too many variables to be accounted for in an information processing or computational model given the limits of biology, and observational evidence of the speed at which actions can take place (Clark, Truly, & Phillips, 1993; Smith & Thelen, 1993). In the 1980s, however, approaches drawing on ecological psychology and especially on dynamic systems theory were able to provide experimentally validated explanations of such phenomena (Abernethy & Sparrow, 1992; Williams et al. 1992; Reed, 1996). By the early 1990s the field was, according to some protagonists, undergoing a full-blown paradigm crisis

with information processing theorists on one side, and adherents of dynamic systems approaches on the other (Burgess-Limerick, Abernethy, & Limerick, 1994; Abernethy & Sparrow, 1992; Bootsma & Hardy, 1997).

The significance of this here is simply that dynamic systems (and connectionist) approaches eschew the idea that organisms have internal representations. Despite differences between these two theoretical approaches, both are "emergentist accounts" that do not depend on postulating internal representational symbol systems (Smith & Samuelson, 2003, p. 435; see also Clark, 1997). Connectionists posit that knowledge resides in latent connections in neural networks that are activated by immediate input; knowledge is distributed across the network. In dynamic systems models, knowledge is emergent in the moment and is distributed across many kinds of processes, spanning the obvious organism-environment boundaries: "knowledge is emergent in the moment, in the task, out of the particulars at hand" (Smith & Samuelson, 2003, p. 436).

The success of connectionist and dynamic systems models of human movement removed support for tacit knowledge since the idea that such representations were essential was dispensed with. The story does not end here, however, as talk of a paradigm crisis has been replaced by discussion of a rapprochement (Abernethy & Sparrow, 1992; Abernethy, Hanna, & Plooy, 2002; Pressing 1999). The suggestion is that the two approaches were in fact operating at different levels of analysis, and thus a multi-level model combining important elements of both approaches would be more appropriate. Research into the control of gait in walking to running transitions provides support for this hypothesis (Abernethy et al. 2002). The automatic transition from walking to running that normally occurs as speed increases can be modeled using dynamic systems theory in terms of the "automatic consequences of the collective structure of the human neuro-muscular-skeletal system" operating in its natural environment (Abernethy et al. 2002, p. 256). But this transition can be modified by walking racers who control it, thus showing that "active cognitive involvement in gait control" can occur (Abernethy et al. 2002, p. 263). Thus on the one level, non-representational models (connectionist or dynamic systems) work best; on another, the traditional information processing approach provides a useful explanatory framework.

So far as tacit knowledge is concerned, motor skills research still fails to provide support for the notion since those automatically executed behaviors that allegedly depended on it can be explained as the emergent outcome of normal body-in-environment processes. On the other hand, that conscious cognitive effort can override such "natural" events is best explained on the assumption of conscious (and thus explicit knowledge using) control. Of course it could be argued that motor skills research has simply clarified the nature of tacit knowledge—it is an emergent form of knowledge, quite unlike other forms, hence the difficulties of defining and studying it. However, to do so simply leaves us in the vicious circularity of postulating something inexplicable

and un-observable to account for certain observations which themselves are the sole evidence of the alleged un-observable. Moreover, much of this behavior appears explicable in terms of unconscious automatic neurological processes (Frith & Wolpert, 2004; Hurley & Chater, 2005). The notion, as Pleasants remarked (1997), is explanatorily empty. In the meantime, motor skills researchers can explain behaviors others would say must be underpinned by tacit knowledge without making such untestable postulates. The obvious conclusion is that, at least so far as motor skills are concerned, the notion of tacit knowledge is no longer relevant or useful except as a loose metaphor, reflecting the history of knowledge management. Whether it remains relevant for understanding other phenomena so labeled is also debatable since, for example, we have studied expertise, and culture, without having to invoke the notion.

3 Explicit Knowledge

In contrast with tacit knowledge, explicit knowledge receives little discussion in knowledge management literature. There is a broad consensus that it is knowledge that is available to verbal report (Bright & Freedman, 1998), is "articulable" (Castillo, 2002; Starke, Dyck, & Mauws, 2003; Vera & Crossnan, 2003), and easily codified (Bou & Sauquet, 2004; Casselman & Samson, 2004, Civi, 2000). Cunliffe (2002, p. 44) in a variation on this theme refers to explicit knowledge as "theoretical talk." Given that explicit knowledge can be expressed in or conveyed by linguistic, symbolic forms (Cowan et al. 2000; Plaskoff, 2003; Bateira, 2003) it is communicable (Casselman & Samson, 2004) and can be "captured" and stored in documents, databases and the like (Civi, 2000; Starke et al. 2003). The metaphor of documents as containers of explicit knowledge is implicit in most of this discourse; Bonaventura (1997, p. 85) makes it explicit, referring to a document as a "multi-media container." Explicit knowledge is also described in terms of what it concerns. It is said to be about facts and theories (Casselman & Samson, 2004; Cunliffe, 2002; Nonaka & Takeuchi, 1995) which fits with other claims that it is abstract (Bou & Sauquet, 2004) and thus (implicitly) objective (Atherton, 2003), and hence canonical (Hannabus, 2000).

Sahdra and Thagard (2003) suggest that the terms explicit, propositional, and declarative all refer to the same kind of knowledge, concerning facts and the like, different terms being used by different disciplines. Propositional knowledge, as Tsoukas (1996) shows, has always been regarded as important for organizations. Epistemologists use this term to refer to knowledge as true warranted belief (Klein, 1998), a view of knowledge largely eschewed by knowledge management writers following Nonaka and Takeuchi's strictures (Nonaka & Takeuchi, 1995, p. 58) although this reflects a wider trend (Pleasants, 1996). This also suggests that the boundary

between "explicit knowledge" and "knowledge" might be blurred or that the two terms are actually synonymous.

The lack of discussion of explicit knowledge comparable to that of tacit knowledge is remarkable. In so far as explicit knowledge is typically defined in terms of tacit knowledge (e.g., Nonaka & Takeuchi, 1995) we might have expected more discussion. Instead this half of the knowledge pair has been all but ignored with the result that there is a tacit consensus that explicit knowledge is not a problematic concept. This is far from being the case as I will show by exploring some aspects of knowledge transfer.

3.1 Knowledge Transfer

Knowledge transfer is generally understood to refer to the process whereby one person's knowledge is transferred to another (Argote & Ingram, 2000; Garavelli, Gorgoglione, & Scozzi, 2002; Szulanski, 2000). Explicit knowledge transfer is seen as relatively unproblematic since it can be "embedded" in "repositories" like documents that can easily be exchanged across boundaries (Argote & Ingram, 2000; Bhagat, Kedia, Harveston & Triandis, 2002; Bresman, Birkinshaw, & Nobel, 1999; Simonin, 1999; Huber, 2001). However, since little or no research appears to have been carried out in this field on the .... of knowledge transfer or on knowledge transfer through documents, (Simonin, 1999; Garavelli et al. 2002) this view appears simply to reflect conventional wisdom. Recently Garavelli and his colleagues have questioned this consensus, noting that although knowledge can be "materialized" into "knowledge object[s]" (i.e., documents of various kinds) "when the object has again to be translated in a competence, it can generate behaviors very different from those expected" (Garavelli et al. 2002, pp. 270–271).

Knowledge transfer literature is principally informed by Shannon and Weaver's mathematical model of the communication process (Szulanski, 2000, p. 11; Argote & Ingram, 2000, pp. 160–163; Garavelli et al. 2002; Shannon & Weaver, 1949) developed to understand aspects of the signaling process. This specifies the basic elements of a transfer: source, channel, message, recipient, and context. Knowledge transfer accordingly entails the processes of encoding the knowledge by or from a source, its transmission through a channel in a message, and its decoding by a recipient. Shannon and Weaver's model was developed to understand aspects of radio and other transmissions. It was not developed for understanding human communicative processes, and its inadequacies in this respect were pointed out long ago (Cherry, 1966; Reddy, 1979; Day, 2000). Garavelli and his colleagues appear to be the first to point to shortcomings of the model in the context of knowledge management.

The problem, they suggest, is that the mathematical model overlooks the centrality of human cognition, and they predict that knowledge transfer will be successful where codifiers and interpreters share a cultural system and work processes (Garavelli et al. 2002), a point also made by Huber (2001, p. 74). Admitting that cognitive and even social processes affect explicit

knowledge transfer marks an important shift in this literature, echoed to a degree elsewhere. Heaton and Taylor (2002, p. 213), for example, suggest that explicit knowledge is not something anyone can understand, but varies in meaning as it is interpreted in different operational contexts. Despite their criticisms, however, Garavelli and his colleagues remain firmly wedded to the traditional model, proposing that knowledge transfer success (i.e., control over the process by authors) can be improved if authors investigate and code for the cognitive systems of potential readers.

Rather than suggesting authors should write taking their readers' cognitive perspectives into account, it might be simpler for readers to organize themselves to mirror the experiences and working practices of authors in order to understand the documents better! After all, from the perspective of the reader the author is relatively knowable whereas authors, necessarily writing for the future, must be ignorant of the variety of their readers. If, as Cherry (1966) and others suggest, the traditional model was not designed to understand human communication, and is inadequate for that purpose, then we should look for an alternative. Human communication studies is a vast field of research that has yet to be explored by students of knowledge management, but I do not propose to enter it here. Rather, since explicit knowledge transfer implicitly involves reading, I propose to look at reading theory.

3.2 Reading Research

Reading research seems an obvious place to look to understand some aspects of explicit knowledge processes, but the large body of research into reading (see Ruddell, R. B., Ruddell, M. R. & Singer, 1994; Smith 1994) has also been overlooked by knowledge management researchers, perhaps because much of it focuses on young children, and on teaching literacy. Nevertheless a good deal of research in this field also concerns the reading process more generally. Reading researchers, like those in many other fields of human behavior, have yet to reach a consensus, but most would agree that it would be a mistake to treat reading as an unproblematic process, and that it involves complex psycholinguistic and sociolinguistic processes. Smith (1994, pp. 221–222) suggests that the many models of reading largely fall into two groups emphasizing either determination by the reader (the "inside-out" or top-down perspective) or by the text (the "outside-in" or bottom-up perspective). It is evident that knowledge management research takes an extreme "outside-in" perspective, regarding knowledge as contained in documents and transferable along with the transfer of documents. Studies by Lam (1997) of engineers, and by Collins (2001a) of scientists illustrate some of the shortcomings of this view.

Documents in Work

Lam (1997) studied product design, focusing on the role of graduate engineers, in a Japanese-British engineering partnership in which managers wanted to

establish co-operative working and knowledge sharing. While the Japanese engineers found it possible to learn from the British documents, the British found it difficult if not impossible to learn from the Japanese, and so cooperation foundered. Lam found that the British engineers expected to receive detailed designs and blueprints in line with their graduate training experiences which had involved early specialization and subsequent work experiences where they had been put to work in their specialist areas immediately after recruitment. Given specialization and consequently a relatively rigid division of labor between engineering specialisms, and between engineers and others in the design process, the British firm placed a high premium on clear, unambiguous documentation as the means for controlling work processes.

The Japanese engineers apparently had similar formal training, but their subsequent work experiences were quite different. As was common in many Japanese firms, they were not set to work immediately in specialist areas, but spent time developing a wider understanding of the firm as a whole by working in different departments. In the product development area, they joined comparatively large teams, comprised of people from a variety of specialisms, bridging the gap found in British firms between design and manufacturing. While the Japanese design engineers were responsible for planning and product design, they did not produce a complete documented product which they handed over to manufacturing. Instead, product development was characterized by strong cross-functional linkages and reciprocal flows of information and exchange of ideas across phases of development and functions and roles. In particular production and manufacturing staff had an active role to play in the overall development process, providing input to the design, not just implementing the designers blueprints.

According to Lam, the Japanese managers felt they were not good at producing documentation, and lacked a high level language to describe their designs. That they could understand the British engineers' documents belies the latter, and the feeling that they were not good at documenting their work is also questionable. In so far as the Japanese had been, and continued to be, successful, then their documentation must have been adequate. What this study indicates, however, is that what counts as meaningful documentation depends on the context of its production and use. Documentation functional for and appropriate to activities where the total cognitive work is loosely distributed in a social group (Hutchins, 1995) as amongst the Japanese engineers, may be inappropriate where there is a relatively rigid division of labor and tasks, and cognitive processes are thus more compartmentalized (British engineers). Of course, in so far as the latter set of processes might be "contained" within the former, documents produced within and for a compartmentalized division of labor will be understandable by people working in the same field with work processes like those of the Japanese engineers, hence their ability to make use of the British engineers' documents.

Collins' (2001a) study of scientists involved in measuring the quality of sapphires provides further support for these contentions. For several years prior to the late 1990s Russian scientists claimed to have succeeded in making the particular measurements at room temperature, something no one else had done. They published their results in scientific journals, but when these could not be replicated, and for a variety of scientific and other reasons, their account was dismissed. Subsequently the Russians were able to demonstrate their success to a team of British scientists, following which the two groups worked together to refine the experiments and develop their understanding of what was involved in success (and failure).

As scientists the Russians implicitly wanted to communicate to their peers since they would be concerned that their claims should be accepted, so we can rule out lack of adequate language (or intentional obfuscation) as issues here. We must also infer that the Russians' accounts were adequate for their own practices since they could presumably use them. The issue here, it turned out, was that the Russians did not fully understand how their results had been achieved because they assumed aspects of their experimental set-up that turned out to be critical for success were irrelevant to the results. It was only through detailed experimentation, both with measuring sapphire quality, but more important, with the experimental method itself, carried out jointly by the British and Russian scientists, that they could identify just how they had succeeded. As Collins put it, in this process "For both parties the science was slowly emerging and turning knowledge that no one knew they could or should express, into something that could be articulated as the importance of previously unnoticed parts of the procedure became revealed." (Collins, 2001a, p. 80). Collins' earlier study of laser development illustrating a similar difficulty suggests this example is not an isolated one (Collins, 1974, 2001b).

These cases clearly show that it is at best naïve to think that documents unambiguously carry knowledge "embedded" in them by their authors, or that authors could anticipate the conditions under which they might be read. Instead it seems more useful to regard documents (at least those like the ones discussed above) as products of particular divisions of labor, "fitting" the needs of those engaged in such processes, and shaped by the authors' cognitive and other limitations. Readers should indeed reorganize themselves cognitively and practically to meet the implicit contextual conditions of documents they use, as is evident in certain approaches to studying history (e.g., Thompson, 1968). Readers' ability to "extract" knowledge from documents is likely to depend on a combination of prior knowledge and experience with what the documents refer to, and the extent to which specific documents "fit" the division of tasks and patterns of interacting with whatever the documents are ostensibly about that the reader is familiar with. One model of the reading process that helps to elaborate this is the transactional theory of reading.

3.3 The Transactional Theory of Reading

This was originally outlined in the 1930s by Louise Rosenblatt (Rosenblatt, 1995) and although her ideas were largely ignored until the 1980s they have received substantial support from experimental studies of the reading process, particularly from the psycholinguistic perspective (Goodman, 1985, 1996; Smith, 1994). Halliday (1973, p. 24), a linguist, described learning words and the structures of language as learning their meaning potential, a view that fits well with the cases outlined earlier, and the transactional approach. Brent (1992) has drawn attention to similarities between her position, and those of others studying reading. Glenberg and Robertson's "indexical hypothesis" (words and phrases are indexed to objects, their analog representations or to internal perceptual symbols, hence understanding is affected by "indexing" processes) which they have studied and validated experimentally (Glenberg & Robertson 1999, 1–2; 2000, 383–384) is also broadly supportive of the transactional theory.

For Rosenblatt reading is best conceptualized as a dynamic event, to emphasize which she called her approach the transactional theory, taking "transaction" from Dewey (Rosenblatt, 1994, pp. 16–18). Dewey had introduced this term to refer to a specific kind of interactions between things, such as between a reader and a text. "Interaction," he pointed out, was an ambiguous word meaning on the one hand interactions between things that were themselves unchanged by the process, and also interactions of a "mutual and reciprocal" kind where the interactants affect each other (Dewey & Bentley, 1949, pp. 108, 295–6). "Transaction" was introduced to distinguish the latter from the former. Thus Rosenblatt characterized reading as a "dynamic, fluid" process, "an interdependent relationship in time between a reader and part of the environment, a text" (Rosenblatt, 1998, pp. 887, 888; see also Rosenblatt, 1994, pp. 17–19). Similar ideas are apparent in general system theory (Von Bertalanffy, 1973), developmental studies (Piaget, 1971; Bronfenbrenner, 1979), the sociology of Elias (Elias, 1974), in ecological psychology and dynamic systems theory (Turvey & Shaw, 1999) and in developmental systems theory (Oyama, Griffiths, & Gray, 2001).

The following quotation provides a succinct statement of Rosenblatt's argument:

> ...we need to see the reading act as an event involving a particular individual and a particular text, happening at a particular time, under particular circumstances, in a particular social and cultural setting, and as part of the ongoing life of the individual and the group. We can still distinguish the elements...not as separate entities, but as aspects or phases of a dynamic process, in which all elements take on their character as part of the organically-interrelated situation. (Rosenblatt, 1985, p. 100).

In common with other models of reading Rosenblatt took into account the reader's past or prior knowledge as affecting the reading process

(Rosenblatt, 1994). She also and significantly emphasized that readers "bring" their present concerns to a reading event, and it is this combination of the effects of past experiences with projected future or expectations that she saw as critical to understanding what a reader got from the transaction with a text. A reading process is thus an "experience shaped by the reader under the guidance of the text" (Rosenblatt, 1994, p. 12) through which meaning emerges for the reader. It is not, as knowledge management authors would have it, a process whereby readers decode meaning/knowledge from a text. The centrality of the reader's activity for Rosenblatt is brought out in this passage suggesting that "text"

> designates a set or series of signs interpretable as linguistic symbols....The visual...signs become verbal symbols, become words, by virtue of their being potentially recognizable as pointing to something beyond themselves....in a reading situation "the text" may be thought of as the printed signs in their capacity to serve as symbols. (Rosenblatt, 1994, p. 12).

All that a document such as this book actually contains is marks on paper that can signify something to a reader (documents also contains spaces between marks, but normally these are not significant, except in so far as without them, the marks could not be discerned). Whether they can signify anything other than being marks depends on a host of other conditions, such as the reader's ability to read; whether they can make sense of the script, and so on. Given all these conditions, whether or not they do signify something, and what they signify, depends on the reader's background, and their present concerns. The above quotation from Rosenblatt carries clear echoes of the indexical hypothesis (Glenberg & Robertson, 1999), which in Rosenblatt's case, was due to her semiotics, taken from Peirce and Dewey (Rosenblatt, 1994).

Rosenblatt underscored the idea that the reader's actions shape the reading event by introducing the notion of "stance" and the distinction between aesthetic and efferent readings (Rosenblatt, 1994, 1998). Stance refers to the "attitude of mind" the reader "adopts" during a reading (Rosenblatt, 1994, pp. 73–75) which is conditioned by previous experiences, and by expectations. The word "heart" for example will have different associations for different people, depending on their experiences, and culture. Stance ranges along a continuum from aesthetic to efferent. In the aesthetic stance, the reader reads for her or himself, for an inner world of experience and feelings. In the efferent stance a "scientific or expository" (Rosenblatt, 1994, p. 35) reading takes place that is instrumental to some other activity the reader is engaged in. It is being undertaken to find out something of use (Rosenblatt, 1994, 1998). In an aesthetic reading, preponderant attention is given to "the affective aspects" of the process; in an efferent reading, attention is given "to the cognitive" (Rosenblatt, 1998, p. 893) although, she stressed, both are always present in any particular reading. She developed these concepts partly

to challenge assumptions about types of text, pointing out that you could read the instructions on, for example, a fire extinguisher to analyze the rhetorical devices employed; to enjoy the language used; to find out how to put out a fire, and so on (Rosenblatt 1994, p. 79). It is the reader's purpose, in the context of their past experiences and present intentions and expectations, that will affect how they treat a text, and thus what they will "get" from it.

To say that readers rather than writers determine what is "in" the text overstates the argument. Rosenblatt's emphasis on the role of the reader partly reflects the initial context of her work when text was seen as determinant (Rosenblatt, 1994). She did not, however, intend that a reader is entirely free to construct whatever meaning they wished from a given document. The action of reading necessarily involves language, and in so far as language "is at once basically social and intensely individual" (Rosenblatt, 1994, p. 20; see also Cowley, Moodley, & Fiori-Cowley, 2004) any meaning an individual constructs in and from a reading event is thus also a socially constrained one. Throughout her work Rosenblatt insisted not only on the importance of what the reader made of the text they were working with, but also that their interpretation is likely to be constrained by the reader's history and context. Further, she insisted we can evaluate readers' judgments even in less precise areas such as literary transactions (Rosenblatt, 1994, 1998). To return to her fire extinguisher example, the reader of the instructions, being a normal member of their society, can read; can understand the kind of language in which such instructions are couched; and given a fire, and being a good citizen of a society which values material property, considers it meaningful to act to put the fire out.

This section has barely scratched the surface of the issues concerning explicit knowledge which as was indicated are contiguous with those of communication through language in general, to survey which would necessarily take us into the wider realm of linguistics, communication studies and the like. Sufficient has been indicated, however, to suggest that it is naïve to assume that explicit knowledge is an unproblematic concept. The consensus that it is knowledge in linguistic form (in words) takes us, once we abandon the almost unavoidable container metaphor ("in"), to the suggestion that what is put into words depends on the context of verbalization, as does understanding of what has been put into words. Thus the Japanese engineers' and Russian scientists' documents were adequate to their contexts but could not be used by others working in different contexts—either due to specific forms of training, or work arrangements and practices. Rosenblatt's transactional theory of reading takes us further along this idea that documents do not and cannot "contain" or "transfer" knowledge. Instead, documents are only containers of marks that readers can interpret in light of their experiences and expectations, thus constructing meaning. This is particularly so in the case of efferent reading, the kind of most concern in management circles. For relevant models to develop this idea we could look to semiotics rather than to the mathematical theory of communication for assistance. Doing this would also help to appreciate

commonalities underlying tacit knowledge/knowing and explicit knowledge processes (Gourlay, 2004a; for a useful review of semiotics in this broad context, see Whitson, 1997).

4 Knowledge—Object or Process?

The phrases tacit knowledge and explicit knowledge are linguistic forms implying two types of a third thing, "knowledge," which, as in so much knowledge management writing, has so far been the ghost at the banquet. According to Nonaka and Takeuchi (1995) epistemologists described knowledge as "justified true belief," although this has recently been modified to "true warranted belief" since justification may rest on false premises (Klein, 1998). This, however, only appears to cover propositional, and hence, explicit, knowledge; the concept of tacit knowledge is treated separately by philosophers (Klein, 1998; Delaney, 1998). Nonaka and Takeuchi (1995, p. 58) went so far as to describe knowledge (justified true belief) as "nonhuman," and in both philosophy and the social sciences the classical epistemological formulation has been criticized or abandoned in particular to accommodate tacit knowledge (Pleasants, 1996). "Knowledge" has been made to apply to wide spheres of human activity, typically implying something underlying or causing overtly observable behavior. As Dewey had noted earlier (1930, pp. 177–178), if we call the "practical work" done by skill and instinct "knowledge," that leaves knowledge involving reflection unaccounted for, which can be confusing (see also Dewey, [1916], p. 16).

Alvesson and Kärreman (2001, pp. 997–1012) argued that in management literature use of the concept "knowledge" suffers from five problems: ontological incoherence; vagueness; breadth, and hence conceptual emptiness; tensions between regarding it as objective, and evidence of its subjectivity; and finally, functionalism. Wilson (2002) reached similar conclusions, pointing out that "information" and "knowledge" are often used interchangeably. Even though some authors, such as Hedlund (1994), acknowledge that these terms should be distinguished they do not do so in practice. Others actually define knowledge in terms of information. Myers (1996) called organizational knowledge "processed information," while Davenport and his colleagues (1998), in a widely cited definition, described knowledge as "information combined with experience, context, interpretation and reflection. . . .a high-value form of information. . . ." Nonaka and his colleagues describe knowledge as "a meaningful set of information that constitutes a justified true belief and/or an embodied technical skill" (Nonaka, Umemoto, & Senoo, 1996, p. 205).

Saying knowledge is processed information cannot advance our understanding unless perhaps we knew how information had been processed, combined, or how information acquires meaning or becomes constituted as a belief. Nothing is said about these processes, however, and thus we find that

one abstract concept is defined in terms of another equally abstract one. Since "information" remains undefined a common-sense understanding is implicitly assumed which will not do: Stamper (1996) has shown that information has a variety of meanings, depending on the level of analysis.

Alvesson and Kärreman (2001) concluded that knowledge is a loose, ambiguous, and rich concept that precludes reduction to simple sets of distinctions, a view Blackler endorsed (Blackler, 2002, p. 54). These views echo a conclusion reached half a century earlier. After much discussion, Dewey and Bentley concluded that knowledge is one of those "'vague words' one is at times compelled to use," and "a 'loose name'" because it has been used to refer to a great many often different things (Dewey & Bentley, 1949, pp. 48, 78; see Ratner & Altman, 1964, for the discussion). The situation has deteriorated since they wrote. In 1945 Bentley could note that whenever "knowledge" was used "living organisms are involved also" (Ratner & Altman, 1964, p. 459) but now "knowledge" is said to be embedded/embodied in "technology" (e.g., Teece, 2001, pp. 126–30; Argote and Darr, 2000, p. 53; Herschbach, 1995, pp. 31–2), in documents, repositories, organizational routines, practices and norms, (Davenport & Prusak, 1998, quoted in Alvesson & Kärreman, 2001, pp. 998–9), and in the "physical structure of the workplace" (Argote & Ingram, 2000, p. 152). "Knowledge" is indeed a "tricky" concept (Tsoukas & Vladimirou, 2001, p. 975)!

An important distinction in the literature is between authors who treat knowledge as an object, and those who treat it as a process (Kakihara & Sørensen, 2002; Sahdra & Thagard, 2003). Rarely, we also find authors who consider both aspects are important to its understanding (e.g., Cook & Brown, 1999). Viewing knowledge as an object is the dominant approach in management studies, and more widely, deriving as it does from the information processing paradigm (Kakihara & Sørensen, 2002, pp. 50–51, 53). We have already seen that Garavelli and his colleagues talk of knowledge being "materialized into knowledge objects" (Garavelli et al. 2002, p. 270). Blackler (2002, pp. 48–54) described this as the "traditional" approach wherein knowledge is regarded as an entity in people's minds, something they have, an idea neatly captured the phrase the "epistemology of possession" (Cook & Brown, 1999, p. 382). This treats knowledge as abstract, as "___" the world, and as something ___ in activities (Cook & Brown, 1999, pp. 382, 387–388). The similarity between knowledge in this sense, and explicit knowledge, is obvious, although Nonaka and his colleagues sought to distinguish them (Gourlay & Nurse, 2005). Kakihara and Sørensen called this a "representationistic" perspective since knowledge is assumed to be symbolic representations of reality held in various places (2002, p. 50). As Clancey noted, reviewing a parallel debate in cognitive science, "knowledge" has been equated with representations and in turn with collections of symbols, such as words and word networks, and thus with stored descriptions (1997a, pp. 250–253; see also Bechtel, 1998).

The processual perspective is less easy to characterize, partly because it is newer, and partly because it includes several different ideas which to group together risks over-simplifying the picture. Kakihara and Sørensen suggested there are three "anti-representationistic" perspectives: knowledge as interpretation, knowledge as process, and knowledge as relationship (2002, pp. 51–4). It seems that these share much in common, and with Cook and Brown's action oriented "epistemology of practice" (1999, p. 382) and Blackler's emphasis on "knowing" linked with situated practices as distinct from "knowledge" (2002, pp. 51, 54–56). Gherardi and Nicolini (2000, pp. 330–33) described a "social-material constructionist approach" to knowledge that is also clearly processual in emphasis. These all emphasize knowledge as an inseparable aspect of on-going situated activity, as distinct from something abstracted from and set apart from activity. Clancey's (1997a, p. 254) metaphor of knowledge as "dynamically developed coordination processes," echoes both situated and dynamic systems perspectives. He also noted that organisms have been conceptualized as systems with a capacity to know (Clancey, 1997b p. 251) as Tsoukas & Vladimirou (2001, pp. 967–983) also proposed.

Of course, suggesting knowledge is, or can be regarded as, an object, (or a process), still begs the question: what is it that is an object or a process? Indeed, distinguishing object and process appears to achieve little more than reproduce the explicit/tacit distinction. This is obvious in so far as explicit knowledge entails representations and is often held to be objective (as well as an object), and tacit knowledge is often rendered as know-how. and largely concerns process (see, e.g., Sahdra & Thagard, 2003). The problem is not a new one, as Dewey pointed out in 1916, and again in the 1920s (Dewey, [1916], 1930). One solution, which Dewey favored at that time, is to reserve the word "knowledge" for the products of reflective, intellectual, processes. Holzner (1972, p. 9) ventured a complementary definition, writing of knowledge as: "the communicable mapping of some aspect of experience by an observer in terms of a symbolic system and frame of reference deemed relevant and appropriate." As has been suggested above, we can avoid the usual assumption that "knowledge" has somehow been incorporated into the writing or the mapping by recognizing that documents are one of a variety of semiotic objects people use to orient their actions. As Holzner's formulation indicates, the user of a "communicable mapping" must be capable of using the same symbolic system, and possess the same frame of reference, as the writer if they are to construct meanings similar to those of the writer, and thus orient their actions along similar lines.

This discussion is already blurring the distinction between "knowledge" and "meaning" or "understanding," perhaps inevitable as it makes "knowledge" (if we wish to retain the word) a mentalistic concept—knowledge is only in the mind, and involves processes like understanding, learning, and so on (Wilson, 2002). Connectionists might accept this since the interconnections in the networks constitute knowledge, or perhaps dynamic representations

(Clark, 1997) in their models. Dynamic systems theorists would disagree for although they too agree that knowledge is emergent they see the organism-in-environment as the relevant system, not the organism-bound-by-its-skin, thus resurrecting an important methodological issue first raised in the 1940s (Bentley, 1954a). In their concern for ongoing activity, connectionists and dynamicists, along with situationists, seem to have overlooked the role of abstracted formalized representations in knowing and knowledge transfer (Clark, 1997; Bereiter, 2002). If, on the other hand, we regard these as artifacts that mediate the generation or construction of "knowledge," as is implied above (see also Whitson, 1997; Gherardi & Nicolini, 2000; Wilson, 2002) then we can incorporate knowledge as communicable mappings into these models.

This further implies that talk of focusing on knowledge as process (e.g., Blackler, 2002; Clancey, 1997a, b) rather than knowledge as object is really beside the point. Instead we should follow Cook and Brown's suggestion, to regard the "possession" and "practice" epistemologies as mutually interacting and their interplay as a "generative" phenomenon (1999, p. 383). But we need to move beyond metaphors to explore ways of conceptualizing these in a single framework that also points toward how we might study these processes. The following framework attempts to do this.

5 Routine and Reflective Activities

The central ideas the following scheme rests on are already implicit in the foregoing discussion. They are that in all of this we are concerned with human behavior or activity; and in particular with two levels of analysis corresponding to the phenomena indicated by tacit knowledge, on the one hand, and by explicit knowledge/knowledge (in its typically loose sense) on the other. Dewey's distinction between "non-reflectional experience," such as the "experience of quenching thirst where the perception of water is a mere incident," and "reflective experience" where "knowledge of what water is, is the controlling interest" (Dewey, [1916], pp. 2, 4) is helpful here.

Knowledge management authors would doubtless claim that quenching thirst involves tacit knowledge (that it is water, not gin) as distinct from the explicit knowledge of the chemical composition of water. In 1916 the phrase tacit knowledge had not been coined, but "immediate knowledge" and "knowledge of acquaintance" were used instead (Janik, 1988, notes the latter is a synonym for tacit knowledge). Dewey suggested it was confusing to call these "knowledge" as they concern "a critical skill, a certainty of response which has accrued in consequence of reflection...[and] is found in instinct and habit" (Dewey, [1916], p. 16). Dewey's non-reflectional experience clearly maps onto tacit knowledge since as we have seen, tacit knowledge phenomena appear attributable to both "habit" (in the senses both of a pattern of behavior developed unthinkingly, and as the repeated exercise of things explicitly learned) and to innate characteristics. However, it is

important to note that Dewey did not intend that non-reflectional experiences were unconscious, or even that they were devoid of reflection. He remarked of a non-reflective experience like being ill: "it is quite possible that what makes an illness into a conscious experience is precisely the intellectual elements which intervene—a certain taking of some things as representative of other things" (Dewey, [1916], pp. 3–4). Non-reflectional experience thus comprises both non-conscious and conscious aspects, and some degree of reflection.

Reflective experiences involve "intellectual knowing" (Dewey, [1916], fn 1, p. 10) which are not merely cerebral or armchair affairs, but experiences in which "the controlling interest" is experimentation and action in the world with a view to establishing and communicating beliefs about some aspect of that world (Dewey, [1916], pp. 10, 13–14). Implicitly, reflective experiences entail suspending non-reflectional experience vis-a-vis that part of the world being acted on.

Dewey compared non-reflectional and reflective experiences as follows:

> all intellectual knowing is but a method for conducting an experiment...The importance attached to the word "experience,"...is to be understood as an invitation to employ thought and discriminative knowledge as a means of plunging into something which no argument and no term can express; or rather...no plunge is needed, since one's own thinking and explicit knowledge are already constituted by and within something which does not need to be expressed or made explicit....there is nothing mystical about this...Its import is only to call notice to the meaning of, say, formulae communicated by a chemist to others as the result of his experiment. All that can be communicated or expressed is that one believes such and such a thing....The word "experience" is,...a notation of an inexpressible as that which decides the ultimate status of all which is expressed; inexpressible not because it is so remote and transcendent, but because it is so immediately engrossing and matter of course. (Dewey [1916], fn1, p. 10).

Reflective experiences take place against a ground of non-reflectional experiences that are the "immediately engrossing" aspects of . . experience and can result in the expression of beliefs about some selected state of the world in socially generated and sanctioned symbolic forms: the chemist's formula and other communicable mappings (Holzner, 1972). Reading this through Polanyian eyes we might be tempted to recruit Dewey to the cause of tacit knowledge. However, it is important to note that Dewey does not find it necessary to claim that what is immediately engrossing must be underlain by some other kind of knowledge or knowing process. Rather, as his references to skill and innate behaviors indicate, he regards this as a natural phenomenon, the combined result of how human beings have evolved, and the natural history of each individual.

Dewey was in effect proposing a dual level model of human behavior. The idea that behavior is effected by both automatic and controlled processing has been a theme in psychology since the late 1890s (which Dewey's ideas perhaps reflected), and the focus of a prominent research program since the 1970s (Schneider & Chein, 2003; see also Nisbett & Wilson, 1977; Iverson & Thelen, 1999). As we have seen, motor skills research appears to find dual-level models of motor control fruitful (Abernethy & Sparrow, 2002).

The very obviousness of this assumption (Dewey, 1916, p. 2), and thus its implications, had been, and continues to be, overlooked, especially as regards "knowledge." Writing of philosophy, Dewey suggested that professional philosophers had made a fundamental mistake beginning their analysis with the ___ of reflective experience. Failing to find its qualities in non-reflectional experience, they declared the latter inferior, and the former superior, thus setting up the problem of the relations between them (Dewey, [1916], pp. 2–8). This is evident in Polanyi's arguments about tacit knowledge. Rejecting accounts of science that represented it as a wholly intellectual activity, Polanyi emphasized the grounding of scientists' activities in behaviors they could not articulate, and suggested this characterized all behavior. Dewey turned the classical position on its head, insisting we should start from ordinary experience if we are to understand the relations between the two aspects of behavior.

Dewey's methodological suggestion presages that made by Schutz, who argued that to understand human behavior we must begin with what seems self-evident to people, with the "everyday life-world" (Schutz & Luckmann, 1974, p. 3). There are a number of similarities between Dewey and Schutz (Webb, 1976). Schutz and Luckmann, for example, described the everyday life-world as "that province of reality which the wide-awake and normal adult simply takes for granted" wherein they take "the natural attitude" (Schutz & Luckmann, 1974, p. 3) which clearly parallels Dewey's notion of non-reflectional experience. Other related notions include Argyris and Schön's (1974) notion of single-loop learning; normal science (Kuhn, 1970); habitus (Bourdieu, 1977), and schema (Strauss & Quinn, 1997). Reflection, according to Dewey, arises when there are difficulties in the situation that require explicit attention in order to devise further actions (Dewey, [1916], pp. 11–12). Reflective experience thus goes beyond the attentiveness of "the natural attitude" and is probably analogous to double-loop learning (Argyris and Schön, 1974) wherein everyday commonsense assumptions are open to question and there can even be reflection on reflection (Schön, 1983).

Before concluding that we could replace tacit knowledge and explicit knowledge with non-reflectional and reflective experiences we need to attend to some terminological issues, and clarify the distinctiveness of the latter concepts. "Experience" is a complex and ambiguous concept (Webb, 1976; Burke, 1994, pp. 96–104) although whatever the difficulties, compared with "knowledge," it has the methodological advantage of directing attention to acting in the world, as well as to the accompanying phenomenological

experience. Dewey later proposed replacing experience with "culture" in its anthropological sense (Dewey, 1981, pp. 361–2), but since anthropologists can no longer agree on the meaning of culture (Strauss & Quinn, 1997) that would not resolve the problem. Dewey's "experience" was clearly intended to indicate ordinary acting in the world in all its simplicity, and complexity (Dewey, 1916, pp. 4–8) and I propose here to use the word "activity" in its place. ("Behavior" too would also suffice, but the word still carries the scars of its treatment at the hands of behaviorists, and would thus be likely to mislead). Activity is at once a vague enough term that nevertheless indicates clearly we are concerned with people doing things, and it is a critical term in activity theory (Engeström, 1993, 1999; Blackler, 1993; 2002). In turn, activity theory's descriptive model relating people, tools, and objects of attention to contexts comprising others engaged in similar activities (community), rules, and a social division of labor is consistent with Dewey's emphasis and, for example, the transactional theory of reading. Activity theory's framework also helps draw attention to what still needs to be stressed—that all human endeavors take place in contexts or situations, and are thus situationally determined.

Calling an experience "non-reflectional" appears to exclude reflection, which is not what Dewey intended. Shutz' phrase, "everyday life-world," appears to signify his intentions better but also implies the chief distinction is between "everyday" life, and other more specialized activities. We need a term that allows us to recognize that activities like scientific work also have their own "natural attitude" as students of scientific work have made clear (Collins, 1974, 2001a). I propose to refer to non-reflectional experiences, or everyday life-world behaviors as _____ _____. Routine activity encompasses automatic, unconscious behaviors due to whatever source (tacit knowledge phenomena) and awake normal behavior, including reflection which here, implicitly is conducted within the typical frames of reference or schemas (the "natural attitude") of an individual, group, or society (Strauss & Quinn, 1997). It is normal science, to use Kuhn's phrase (Kuhn, 1970) provided we extend "science" to cover all kinds of activity.

Reflective experience seems less open to misinterpretation (provided we recall that it is not merely cerebral, but involves activity in and on the world), but still retains that difficult term "experience." I propose to use _____ _____ since this makes this a species of activity and hence links it to the wider more general term. "Reflective" emphasizes the idea that this activity involves isolation and examination of some part of normal routine activity; a suspension of the "natural attitude" with respect to ___ limited aspect of normal activity, largely with a view to generating a communicable representation or mapping of that aspect. The purpose of reflective activity, as Dewey emphasized, is to complete specific tasks set by problems arising in a related routine activity, thus ultimately enabling that routine to be resumed (Dewey, [1916], pp. 12–15).

Posing the question in terms of routine activity and reflective activity might seduce us, given our "natural attitude" of dualistic thought, into seeing

these as distinct and even opposed categories. Dewey indicated that non-reflectional/reflective experience forms a continuum; they are not simply opposite or polar categories (Dewey, 1916 fn 1, p. 10; 2–14). Indeed, he suggested that it was a consequence of having started our inquiries from the products of reflective activities that we had lost sight of the continuity of experience/activity as a whole (Dewey, [1916], pp. 4–5). However, this is a unusual continuum in so far as reflective experience is "subsequent" to a non-reflective experience, and is instrumental to continuing with the latter (Dewey, [1916], pp. 4, 12). Hence in a sense non-reflectional experience "contains" reflective experience. This is also implicit in the earlier quotation comparing reflective and non-reflectional experiences: "experience" in general is just "there"; it is what constitutes thinking and explicit knowledge; it is "immediately engrossing and matter of course," and the meaning of reflective experiences is grounded in such experience in general (Dewey, [1916], fn 1, p. 10).

The ecological system metaphor, very familiar by the late 20th century, but not outlined until the 1920s (Von Bertalanffy, 1973), would perhaps be more appropriate than the metaphor of a continuum. Thus a specific experience, such as reflective experience, should be considered as "nested" within a wider, non-reflectional, experience. Furthermore, just as non-reflectional experience in general has an unconscious "base" of implicitly structured automatic behaviors and a conscious "superstructure" wherein actors are reflecting in a limited way on their actions, so too does each specific experience. A highly systematic reflective activity, such as the work of scientists, also rests on the assumptions of normal science, as well as unarticulated assumptions and even critical but unrecognized practices. The system metaphor would also be appropriate since von Bertalanffy later endorsed Deweyian concepts like "transaction" as a system concepts (Von Bertalanffy, 1973, p. 40; Bentley, 1954b).

It might be objected that, apart from suggesting the system metaphor, all I have done is to substitute routine activity for tacit knowledge, and reflective activity for explicit knowledge. If this were all, it might not amount to much, although replacing "knowledge" with "activity" implicitly makes studying knowledge/knowing processes easier since it directs our attention to something observable. Moreover, we have many techniques to study these processes at levels from the neurological to the sociological. More important, however, it might be argued that, on the assumption that overt observable activities must be underpinned by knowledge, that tacit knowledge is still involved, underpinning routine activity.

As Pleasants (1996, p. 249) so succinctly put it, "tacit knowledge" is "explanatorily empty." Having observed that someone can ride a bicycle, speak a language, or behave correctly in specific situations, we have simply redescribed that behavior as the effect of a hidden process, tacit knowledge. Invoking an unobservable to explain an observable in this way is as useful as claiming that opium works because it has the power of making people

sleep (Dewey & Bentley, 1949, p. 101, n. 49 referring to Molière's   ). Indeed, the idea that people, particularly scientists, possess special powers is central to Polanyi's thought about tacit knowing/knowledge (1969a, p. 133; 1969d, p. 173), and implicitly, to all theses about tacit knowledge.

The problem here lies in the mode of "explanation." Explaining observable events in terms of underlying intrinsic powers or characteristics is an ancient mode of explanation (Dewey & Bentley, 1949). It is deep-rooted in our culture (Gottfried & Gelman, 2005) suggesting it has a psychological and/or cultural origin. In 19th century psychology, "faculties of mind" were invoked to explain until it was pointed out that such "explanations" were spurious as they classified and explained behavior in the same terms (Bechtel & Richardson, 1993, p. 98; Reed, 1997). In biology, vitalists invoked the notion of "life force" that too has since been abandoned because it explains nothing (Jacob, 1993; Mayr, 1988, pp. 12–13).

Postulating something that has not been observed to explain observable phenomena is in the traditions of good science but all too often, as is the case with tacit knowledge, this can lead to explanatory and methodological dead ends, choking off inquiry. Assuming that we are here engaged in something akin to scientific inquiry, such notions are of little or no use. "Tacit knowledge" is a term that belongs to past commonsense or folk attempts to understand behavior and in so far as studies of automaticity, implicit learning, and their underlying neurocognitive mechanisms appear able to manage well without such a notion, so too can management studies.

So far I have argued that Dewey, and others, give us good grounds for adopting a multi-level, ecological systems-type perspective to conceptualize the distinction and relations between what have hitherto been misleadingly called tacit and explicit knowledge. It is evident that   (Dewey's non-reflectional experience, and Schutz' natural attitude) encompasses all the phenomena discussed earlier as tacit knowledge. Tacit knowledge is typically viewed a possession, but can also be seen as emergent in the situation. Emergent knowledge, however, is also used to refer to verbal expressions of knowing in a situation, to explicit knowledge in common parlance, and is also included in routine activity.

On the other hand, we have   which typically involve suspending belief in some aspects of the natural attitude (while themselves still being grounded in the "natural attitude" of the specific reflective experience). These are usually conducted with a view to tackling some problem arising in routine activity, their immediate result being the production of communicable representations of beliefs about such and such state of the world as guides to resuming or correcting routine activity. The question of the relationship of knowledge as process/tacit knowledge to knowledge as object/explicit knowledge can thus be replaced by the more tractable one of the relations between routine and reflective activities, which

will enable us to deal more effectively with many of the central issues that concern knowledge management.

In order to suggest how routine and reflective activities are related in a way that throws light on some of these important problems of knowledge management, we need to introduce further terms to distinguish phases of activities. This draws on the work of Clancey who proposed that central to activity is "improvisation-in-action" (1997a): the actor simply gets on with whatever the activity is. Given ideal conditions, an activity may proceed from beginning to end entirely as continued improvisation, in this sense. Improvisation is not intended to suggest making things up, but rather that what it necessary to know to carry out the activity becomes known seamlessly with acting—"what one needs to know to behave appropriately becomes a product of behaving" (Keller & Keller, 1993, p. 141). Knowledge is "dynamically constructed as we conceive of what is happening to us, speak, and move" (Clancey 1997b:7); knowing occurs in the process of acting (Sierhuis & Clancey, 1997).

If there is some difficulty in conditions attending the improvisation, this is suspended. In order to continue the activity, intermediate steps have to intervene to identify the cause of the hitch, and decide what to do to either resume or to abandon the interrupted improvisation. Keller and Keller's account of craft blacksmithing illustrate this clearly. They describe how, given an overall objective and plan to make something, "each step of the way, constellations, microorganizations of task conception and material conditions, are developed in the act of production..." (Keller & Keller, 1993, p. 135). These "microorganizations" may be no more than a fleeting pause in improvising to grab a new tool not included in the inventory to hand, a minor flow in the action perhaps not even consciously registered by the actor. This suggests that we can analytically distinguish three aspects of any activity: improvising, reflecting, and deciding. Such "reflecting" involves no radical departure from the central activity; no break in the frames of reference within which the activity as a whole is carried on. If reflecting is to lead back to improvised action, this implies some conclusion was reached, and a decision to act was taken, hence deciding as a third aspect of activity. Figure 1, below, suggests graphically how routine and reflective activities are carried on and related.

All human actions take place in time and space, a truism that should not need stating except that, at least in management studies, models of behavior sometimes overlook these constraints. The time and space implied by improvising in action are a continuous uninterrupted time in a contiguous space, most likely experienced by the actor as "flow" because of the neuro-cognitive processes involved (Dietrich, 2004). The time taken to complete a whole activity may be broken into segments, just as the space occupied by the activity may also be fragmented. The whole process of making an iron tool described by Keller and Keller (1993) involved several phases. The project was to make a replica iron tool for a museum, but since they were concerned with
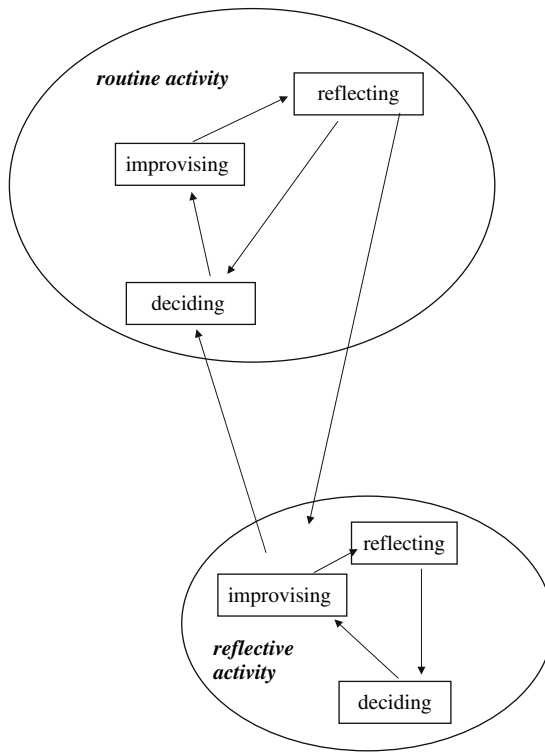
Fig. 1. Routine and reflective activity

authenticity, and not having made this particular tool before, the activity began with phase of reflective activity (consulting catalogues, descriptions, and examples of authentic tools). These implicitly occupied various places, and took place over several phases of time. Once completed, an "umbrella plan" of the activity of making the replica could be made. Since one of the authors was an experienced smith, further extensive reflective activity was not required. The replica could be made in a relatively uninterrupted phase or set of phases of improvisation in action (Keller & Keller, 1993, pp. 129–135).

It is now evident that, in certain circumstances, the three phases of routine activity can to a degree become activities in their own right, disassociated in varying degrees from the activity they refer to. Research into what the original tools Keller made could have been carried out by someone else. It might already have been done, and all Keller had to do would be to read the resulting document. Planning too could be carried out by someone else, as we proceed to implement a division of labor around what was previously a unified set of tasks. That this kind of thing has happened is all too evident from the history of work over the last few hundred years or more.

A reflective activity of course has its own phases of improvisation, reflection, and planning. The process of generation of separated reflective

activities is thus in principle infinite—someone can write a book about writing books about making replica iron tools, and so on as the products of what might be called a first level reflective activity (one in the direct service of another activity) are themselves reflected on.

An actor who intends engaging in an activity more than once, who has to engage in related reflective activities, may wish to make some kind of record of them in order to be reminded on a later occasion as to how to act appropriately. So far as the individual is concerned, such devices can be in any form, such as the proverbial knot in a handkerchief. The communicative potential of knots, however, is very limited as even the maker may forget what it was for! Similar functions can be more efficiently found in language and words which of course raises the possibility that reflective activity will not only enable one actor to continue the work, but that others will be able to make use of resulting communicable mappings of the activity. Of course, as we have seen, it is not sufficient that a second potential actor can understand the words, they must also know to what they refer in order to make greatest possible efferent use of the mappings. This is only likely when the two share language, tools, ways of thinking, and so on.

6 Conclusion

Tacit knowledge is no longer, and may never have been, a useful concept. Less forcefully, its utility is like that of its sister notions, such as life force—it directed attention to aspects of behavior that had been neglected, but has ceased to be a useful conceptual tool because it provides no basis for directing further study. It is evident we have no clear coherent theory of tacit knowledge and the claim that such a form of knowledge underpins behavior rests on a set of weak assumptions. These are, first, that behavior is underpinned by knowledge; second, that actors should be able to articulate the knowledge underpinning their behavior; and third, that if they cannot do so, then the knowledge is tacit. Motor skills research provides explanations for behaviors actors cannot account for, as does research in, for example, the cognitive neuroscience of social interaction (Frith & Wolpert, 2004), and imitation (Hurley & Chater, 2005) without invoking the notion of hidden knowledge. Instead, these kinds of behavior appear due to our being biological agents acting in their natural environment, acting that leads both to automatic behaviors, and to biological changes that influence subsequent encounters with similar environmental conditions. (This phrasing is still inadequate since arguably we should shift from an organism-environment perspective to an organism-in-environment perspective, or, as Bentley (1954a) put it, we should stop tacitly attributing much significance to the skin as a boundary so far as behavior is concerned). The suggestion, then, is that if other disciplines that have also studied unconscious and unconsciously directed behaviors do so without resort to

something that is by definition unobservable, those disciplines concerned with "knowledge" might benefit by following their example.

If there is no tacit knowledge, this leaves its twin, explicit knowledge, somewhat in a limbo. Or, rather, leads us back to the kind of position urged by Dewey, Holzner and others. The word "knowledge" is perhaps more useful if confined to refer to the products of reflective activities resulting in the production of communicable mappings or descriptions that in turn can function to suggest or direct further actions on or with whatever is described. It seems important here to remember Dewey's insistence on the continuity of inquiry (Dewey, [1916], pp. 5, 19–20)—there is no logical end in the production of descriptions (even if that is what often happens, given the typical division of labor in our societies) but rather descriptions are only an invitation to resume activity with whatever is described. They are always in a sense provisional, and open to further revision. One of the difficulties here, given the pervasive influence of the conduit metaphor perhaps, and our current concern to manage "knowledge" more effectively, is that we then assume the knowledge is "in" the descriptions (or even, "in" other kinds of products and processes).

Once again, however, our metaphors deceive, and misdirect our attention. Descriptions are only noises people make to each other, disturbances in the air that we have developed ways of reproducing by making marks on surfaces, such as the ink marks in a text. Rosenblatt's transactional semiotic perspective, and that of others working to understand how texts work (employing, for example, the indexical hypothesis—Glenberg & Robertson, 1999), indicates that readers construct meaning from their transactions with those marks. Our ability to do this depends on a host of prior experiences such as familiarity with texts as tools for communicating ideas, with the language of the text and so on. Beyond the text-reader transaction itself, texts that are about some potential activity in the world (intended to be read "efferently," in Rosenblatt's terms) are created on the assumption that the conditions for acting will be those the writer is familiar with. Writers have no option but to make such assumptions, but clearly this causes difficulties for readers who might work under different conditions, and who do not understand what the writers' conditions were. Writers cannot control this, or perhaps can only in limited ways, by providing cues to readers as to how to understand the text since they cannot envisage all operational conditions.

The importance of controlling subordinates and operations in management practices means managers place a premium on precise communication, and assume that "knowledge" can be transferred through written documents. The foregoing perspective on documents and reading suggests this is a distorted view of how documents function. The illusion of knowledge transfer is particularly difficult to dispel. When, for example, we find that a 3500 year old technical recipe for making glass can be used to good effect (Toulmin & Goodfield, 1962, pp. 30–31) we are tempted to infer knowledge transfer and wish all documents could be as effective. Since texts of more recent origin fail to have similar effects, we are tempted to blame the documents (or readers).

Again, however, a transactional, organism-in-environment perspective seems more useful: the ancient glass recipe can be used because modern experts can identify the chemicals mentioned, and are sufficiently familiar, as experts, with the basic processes of glass-making that they can orient their actions along functionally similar lines to those of the ancient authors. They can thus construct appropriate action orientations toward the materials, and make glass accordingly. The potential of a document to engender thoughts in a reader that lead them to orient their behavior toward some object in a manner functionally similar to that of the author depends on a whole host of factors. Documents and other artifacts do not "contain" "knowledge" but are themselves thought-orienting (and hence action-orienting) tools.

If "knowledge" is not to be found in documents, where is it? One suggestion (e.g., Wilson, 2002) is that it is only in the head, a mentalistic concept. Saying this risks a return to the methodological dead-end of tacit knowledge assumptions—if knowledge is only in the head, surely people should be able to articulate it, and so on. But what we tend to mean by saying that knowledge is in the head is that the head's owner is able and likely to behave in such and such a manner toward some object, just as we might claim knowledge transfer has been achieved if my behavior toward some objects becomes like the writer's after I have read their book. Dewey and Bentley's conclusion that knowledge is a loose name we are occasionally compelled to use (Dewey & Bentley, 1949, p. 48, 78) is a compelling one. It is risky to rely on loose names if we wish to engage in secure communication, let alone scientific endeavor. Perhaps we should set "knowledge" aside, if not also regard it, too, as a redundant notion akin to life force, if we are to develop our understanding of what managing "knowledge" implies.

I have suggested, following Dewey amongst others, that we can usefully focus attention on activities rather than "knowledge." This is consistent with current treatment since "tacit knowledge" is always said to be contextual and associated with some kind of activity, and it is also clear that the relevance of "knowledge" in knowledge management discourse is with activities. Dewey's distinction of non-reflectional and reflective experiences gives a lead to making what seems a useful distinction: between ordinary everyday life-world activities carried out holding the "natural attitude" (Schutz & Luckmann, 1973) on the one hand, and reflective activities on the other.

Routine activity encompasses all the phenomena of "tacit knowledge" together with our everyday communicable mappings. Reflective activity on the other hand points to those activities that are geared toward inquiring into and producing descriptions of some typically problematic aspect of our everyday life-world in order the better to control it. If descriptions can hold good over 3500 years or more, that is because readers can still identify (index—Glenberg & Robertson, 1999) the objects and actions they refer to, and can carry out the actions. If they fail over a much shorter time, and even amongst people such as scientists who intend to communicate to each other, then this is probably because some critical aspect of the experiences

of the authors was not communicated to the readers, for a variety of reasons. Descriptions clearly have to be faithful to the reality they purport to be about if there is to be the slightest chance that they will facilitate the illusion of knowledge transfer. But, as Glenberg and Robertson's research has shown, their functionality depends on the readers' active familiarity with whatever objects the descriptions concern, thus taking us back to routine activities.

In a sense this approach makes managing "knowledge" no different from managing in general. On the other hand, it also suggests that Taylorist visions of total control, of being able to treat people like computers, by recording and documenting all activities, is an unreal dream, even a dangerous one. It is unreal because, except in the most mechanical activities, human intervention deals in the uncertainties of the activity, the "microorganizations" of activity that appear essential to final products. It is also unreal because for human beings documents are only orientation tools; they are not analogous to computer programs. It is dangerous because, in so far as innovation and inventiveness are important, the dream of control threatens the flexibility and freedom to interpret that these depend upon.

If managing "knowledge" is to mean something different from managing in general, it is because consideration of the problems has raised all these kinds of issues. If the variability in human behavior cannot be eliminated then how is the balance between control and interpretive innovation to be managed (and what does "managing" mean under such conditions)? It is also implicit that there is some value in studying work processes properly in order to make potentially useful descriptions of aspects of the activities. At the same time, the fact that human actions have an irreducible unconscious automatic base points to the limits of any attempts to describe, and to prescribe through descriptions. We already possess many techniques for studying human behavior, and can begin to apply those more systematically in organizations, and to society as a whole. Of course, to do so depends on accepting that the social sciences (broadly construed), despite their current primitive state, do have something to contribute, something managers and politicians are largely reluctant to concede, not that the "harder" sciences are always listened to with respect. We also know much about how descriptions are used, and can draw on that to enhance our understanding of the potential and limits of documents. We appear to know little about how, if at all, we can influence automatic behaviors, and perhaps to do so will raise fundamental ethical issues, just as earlier attempts at subliminally influencing behavior did. On the other hand, we already know, for example, that use of metaphor inspires acceptance of leadership (e.g., Mio, Riggio, Levin and Reese, 2005) and it is probably only a matter of time before we understand better how to influence automaticity, though it is doubtful if we will ever be able to control it since once people think they are being manipulated, they have a tendency to resist, and we know that conscious effort can override automatic behaviors.

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Trust and Knowledge Sharing in Organizations
Theory and Practice

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Abstract: This paper explores elements of a favorable environment or climate for knowledge Management (KM) based primarily on collaboration and trust. It focuses on knowledge sharing aspects of knowledge management practices, and it demonstrates why there must be a climate of trust before organizational activity can support knowledge sharing. Trust is explored from the standpoint of ethical practices and the desire to create a learning organization. Evidence from the qualitative data resulting from a study of knowledge management in large organizations in New Jersey is used to support the arguments made in the first part of the paper.

1 Introduction

Knowledge Sharing (KS), a component of Knowledge Management (KM), is less focused on technology in organizations and more related to relationships among co-workers that promote information exchange and learning. In an organization where there is an active interest in learning, innovation, and continuous change, sharing knowledge in order to achieve the organization's mission becomes a routine practice (Davenport & Prusak, 1998; McInerney, 2002; Penuel & Cohen, 2003). This is opposed to some early views of knowledge sharing where it was assumed that large databases would capture and store a comprehensive collection of documents representing what people in the organization knew. Databases of what could be termed "knowledge artifacts" are still important in knowledge management, but, today, it is generally assumed that knowledge sharing evolves from efforts to build a learning organization (Senge, 1994), and from work that supports knowledge communities (Wenger et al., 2002). The concept of knowledge sharing views knowledge less as a thing and more as a process that evolves from the ongoing iteration of conversation, reflection, questioning, and absorbing new knowledge, all filtered through a base of individual experience (Nonaka & Takeuchi, 1995). Before knowledge and information can be shared easily, comfortably, and openly, though, there must be an environment that supports knowledge sharing.

Creating an environment of trust so that knowledge can be created, shared, and used effectively is an ambitious undertaking, but all categories of information professionals who work with representations of knowledge (system managers, information service, line managers, archivists, marketing personnel, Website coordinators, and specialized librarians) could lead in establishing such an environment because knowledge is built on information. The climate for knowledge sharing is established not only by top management but also by those who have knowledge to share. Knowledge communities can be characterized by the shared sense of values their members possess, the common understandings and vocabulary they utilize, and connections they make with one another in the solution of problems more so than by direction from management or assignment of task activities (McDermott, 1999). Knowledge workers, members of communities of practice, and professional organizations can develop habits of knowledge sharing for the advantage of their own members and networks, and, thereby, establish processes and practices that can become embedded in organizations.

The purpose of this paper is to make a case for the claim that knowledge sharing or exchange depends on a climate of trust within the organization. The results of research in New Jersey (USA) that was focused on knowledge management in large corporations shows that information professionals recognize the need for trust and can be influential in establishing the kind of climate that fosters knowledge sharing.

2 The Case for Knowledge Sharing, not Knowledge Management

One of the key questions in the information community is how a concept like knowledge can be managed. Knowledge is considered a process by some and an object by others (Zack, 1999), but it is difficult to escape the fact that knowledge is based within beings. Knowledge is gained by the functioning of an individual's body and mind through experience, interactions, and learning (Davenport & Prusak, 1998; Wenger, McDermott & Snyder, 2002). Knowing is a dynamic process (McInerney, 2002), and consequently, it is difficult to imagine how knowledge can be captured and placed in a database or a repository for others to see, absorb, and make their own. Statements like "capturing" and "storing" knowledge are fairly common in KM literature, despite the apparent contradictions such a view presents. Those who write about "capturing" knowledge are undoubtedly referring to the use of representations of knowledge in documents and other instances of expression because it is obvious that the "know how" and "know what" of human beings are not easily captured things.

Many who come from the management perspective write easily about knowledge objects, knowledge repositories, and knowledge management programs; these writings have formed the core of the knowledge management

literature (Ackerman, Pipek, & Wulf, 2003; Alavi & Tiwana, 2002; Nonaka, 1998; Stewart, 2001). Others have been critical and incredulous when faced with the idea of managing knowledge. Wilson (2002) indicates that the idea of knowledge management is "nonsense." He states:

> ...data and information may be managed, and information resources may be managed, but knowledge (i.e., what we know) can never by managed, except by the individual knower and, even then, only imperfectly (2002).

Even those who have the knowledge, Wilson maintains, have very little power to control it in any sense, let alone manage it. Wilson lays out the argument that many have simply substituted the term "knowledge" for the term "information" when writing about "knowledge management" as opposed to "information management," but, Wilson says, it is not a sensible vocabulary substitution. Information is tangible, he seems to suggest, whereas knowledge comes from a process based on a particular being's context-based experience and learning in his or her own situated life. Wilson's arguments are persuasive when one considers the words "knowledge management" literally, but the term has come to mean much more than just "managing knowledge." At the core of knowledge management practice and KM literature today is a desire to encourage the , not the control over personal knowledge. Wilson's arguments are more compelling if one views knowledge "management" as an intrusive practice where managers force employees to reveal what they know. However, traditionally many knowledgeable professionals have willingly shared what they know (before and after systematic "knowledge management" efforts) through teaching, apprenticeships, mentoring, lectures, conversation, writing and active participation in knowledge or epistemic communities or communities of practice. Sometimes this kind of knowledge sharing calls for a certain degree of altruism when no explicit rewards are available for doing so, and in competitive firms, there may be a natural inclination to withhold personal knowledge. On the other hand, being the one to whom people turn for knowledge or expertise can bring genuine rewards especially in terms of reputation or status. In addition, there are advantages in sharing of knowledge because it can be necessary in order to be able to exploit and explore knowledge.

3 Considerations in the Sharing of Knowledge

What are we to make of Wilson's assertion that information is tangible and knowledge is both process and the essence of a person's own being? It is certainly not possible to share one's "essence of being," and absolutely absurd to think of managing it, as in the phrase "knowledge management." Wilson's argument against the possibility of sharing knowledge is solid if one thinks of "knowledge transfer" as moving one's essence to another. However, one might also consider what happens in the process of sharing a "knowledge object or

artifact." The object is a representation of knowledge held within a person, but not knowledge itself. A knowledge object might be a photograph of a work of art, a videotape of a talk where the speaker is explaining some of what he or she knows; a written report of lessons learned through an experience, or it might be a graphical flow chart of procedures that had been known by one person before making that procedure explicit by drawing it. It is common for a speaker of some repute or expertise to visit an organization and share what he or she knows with the audience in one place at one point in time through a presentation. If an organizational member is not able to attend the talk that day, the opportunity to experience the presentation is lost. However, if the talk can be captured in an audio and/or video file, and if the presentation slides can be placed on an intranet or Website, then a version of the presentation is available through the knowledge object for review and re-use. Seeing a video file of the presentation does not have the immediacy or energy as one experiences by being in an audience, for example, but at least it can be a good substitute for being there. This is where knowledge sharing meets knowledge management and where technology can assist in making knowledge objects available.

Writers often use "knowledge" and the management or sharing of knowledge as a figure of speech when what they really mean is creation and use of "knowledge objects" or the "representation of knowledge," or even the process of knowing itself. Seeing or writing about "knowledge" as a synecdoche, that is, a part representing a whole, makes more sense than using "knowledge" literally as that which we know and hold within our being. So when a writer states, "we want to share the 'knowledge' of our employees," what he or she might really mean is "we would like to teach each other the lessons we have learned or the skills that are necessary to function well in this organization" (Hislop, 2002). Clearly, one person can never teach another everything he or she knows, but there is a legitimate process of teaching and learning where the skilled or "master" instructs the less skilled or novice in a skill or subject matter and therefore shares part of what the more experienced person knows. "Knowledge management" might also mean the management of knowledge objects to aid in the creation of new knowledge in order to encourage innovation, or KM could refer to a way of managing so that the constituent members of an organization become willing to share both the information and the methods that help people become more knowledgeable (Ipe, 2003). For example, a manager might teach new employees how to conduct productive and appropriate meetings so that meetings are used only when it makes sense to bring people together. Managers can support coffee break rooms or on-site cafeterias that encourage people to meet and share what they know. Research has shown that when organizations lose these informal meeting spaces (when employees all work off site or telecommute, for instance), critical information exchange can be lost. When a computer firm mandated that all sales people work out of their homes instead of having a company office, the sales force was less able to give critical feedback from

customers to marketing staff or product developers as they had done in the past over lunch in the company cafeteria. An online feedback system had to be created to capture this customer feedback because face to face interaction among people in different divisions had been virtually eliminated (McInerney, 1999).

Organizations benefit when senior employees share knowledge that has been gained through experience, education, trial and error, and research with novices so that newcomers can presumably make fewer mistakes and be more comfortable knowing the accepted way things are done. There is also a need for new hires to feel like insiders with a sense of belonging. Receiving advice and information from senior staff can encourage confidence and ease a newcomer into the culture of the organization. Huysman & de Wit (2003) studied ten large companies and examined how they managed the sharing of knowledge to understand the variety of methods used and how successful they were. The results highlighted the structure of knowledge sharing in four organizations: Schipol Airport, ING Barings, Cap Gemini, IBM and other commercial as well as not for profit firms. The researchers found that programs recognizing KM as a flow of knowledge were more successful than those viewing knowledge management as stock (or collections) of knowledge. "Flow of knowledge" in this case meant knowledge being shared among organization members. Another finding from the study demonstrated that implicit practices are more successful than directive ones. In other words, if there is an ongoing climate of knowledge sharing, chances are that knowledge will be shared more willingly than if the manager forces employees to share knowledge through directives.

There is also a need to share knowledge laterally with staff of comparable status when expertise is needed across departments or organizational units, especially when there is a merger or acquisition. However, many organizations experience problems with this exchange of knowledge as documented by a study completed by Ernst & Young (Ruggles, 1998). In a survey of 432 companies in the U.S. the consulting firm found that only 13% of the firms thought that they were doing a good job of sharing knowledge internally from one unit to another.

There can be many problems inherent in sharing knowledge especially if the organizational culture is more competitive than collaborative, and certainly a good many companies depend on competition (e.g., sales commissions, attorneys' billable hours, consultancy work, and winning contracts) to survive and succeed. For much of the business world competition is a way of life, often associated with business behaviors in the U. S. but now characteristic of many global businesses, and if workers, executives, and departments are all in competition with each other, there is little motivation to share knowledge. The assumption is that knowledge is power, so on the surface it may seem counter intuitive to share knowledge in a competitive firm, because by doing so, the competition gains more power. It is the long term benefits that everyone gains from sharing knowledge that make it strategic

to do so. While one may argue that such knowledge sharing depends on the organizational context and type of knowledge, processes may be enacted to overcome potential barriers, for example, the approach to knowledge markets proposed by Davenport and Prusak (1998) in which buyers, sellers and brokers interact to exchange knowledge in the accomplishment of organizational tasks. Davenport and Prusak suggest that trust is a critical factor in these transactions, stating that it can "trump the other factors that positively affect the efficiency of knowledge markets," (p. 34). Trust can be created by being visible, ubiquitous, and representing the engagement of and support from senior management (pp. 34–35).

Efforts to change work processes in the 1980's and early 1990's to make them more efficient and responsive to customer needs, generally known as Business Process Re-engineering (BPR), required making those processes visible; and the reluctance of many employees to make known their individual work practices highlighted the difficulties that are inherent in sharing individual knowledge of workers (Suchman, 1995). Despite the emphasis on competition in many workplaces, though, collaboration and partnership can be positive necessities, as the airline industry, newspapers, and car manufacturers have learned through their alliances with producers and providers. From the perspective of the business climate in the early 2000's, these collaborations arose out of necessity as much as strategic management, since without the cooperative ventures, some businesses, even large and well established ones, would not have survived the harsh economic environment of corporate downsizing and budget reduction. At the heart of collaboration is an understanding that parties involved share what they know and trust their partners, even if they were competitors in the past.

4 Trust—The Basic Environmental Factor for Knowledge Sharing

Why is trust necessary for knowledge sharing? "Trust is the mutual confidence that no party to an exchange will exploit another's vulnerabilities" say Barney & Hansen (1994, p. 176). In competitive industrial environments employees may want to guard what they know because they are not sure how others will use the special knowledge they have. The danger of being misquoted or discovering that knowledge freely shared has been used for underhanded or unsavory purposes is always there. Before one shares knowledge, there is an assumed understanding of trust that the knowledge will be seen as helpful and used only for the good. One might even say that one tenet of professional ethical behavior in the act of sharing knowledge is to "do no harm," the axiom followed by physicians from ancient times and adopted by other professions through the years. Since sharing knowledge, like trust, is often an act of generosity, it calls on good will of the knowledgeable to be willing to offer what they know (Darley, 1998; Flores & Solomon, 1998).

A trusting environment can be at odds with the traditional role of management to exert control, to monitor efficiency and employee presence (Handy, 1995). In today's work environment of global companies and organizations where some (and sometimes many) employees work remotely, though, an element of trust is already necessary between managers and work teams. It may be impossible for managers to see the employees they supervise at all times, so managers must trust the staff members not present to do work as expected. Work has become "what you do, not where you go," as Handy says (1995, p. 42), and managers are learning how to manage by looking at results, not merely checking to see if the employee is physically present, or "sitting in the chair."

These organizations where many individuals work remotely from the organizational setting (for example, teleworkers, those with heavy travel schedules, or those who work at a branch office) are out of site/sight, but they also rely on knowledge sharing. For example, journalists on a story, consultants, salespeople, virtual team members who work for common goals, but who may be working in different states or countries, do not all have visual or even voice contact with their supervisors on a regular basis, so supervisors have to look to outcomes to see that work is being done. Employees are trusted to complete their work in a quality way. These knowledge workers rely on organizational knowledge or knowledge from their communities of practice in order to do their jobs as well. Of course, e-mail has helped keep communication flowing, even though some individuals are better than others in taking the initiative to check in on tasks and projects.

Trust comes hard in some organizations. It takes time to know someone well enough to trust, and in some fast-paced work environments, workers don't really know each other at all. It often helps to have a history with co-workers so that trust can be built on confidence from past experience. In organizations that have fluid and frequent personnel changes, trust is not immediate and may be elusive.

At the University of Texas Jarvenpaa, Knoll, and Leidner (1998) studied virtual teams that worked remotely, and they found that teams could establish "swift trust." The study found that so-called team building exercises did not have a direct effect on trust. Trust could be predicted, it was found, by the perception team members had of the other team members' integrity, rather than other characteristics such as benevolence. Researchers found that the traditional social controls based on authority are often absent in new organizations, and trust is created and exhibited by individuals. This same locus of control, i.e., based within individuals, is true in the knowledge sharing process as well. In a process parallel to the creation of trust, knowledge is created in individuals, and it is incumbent on individuals to decide whether they will share knowledge and decide whether they will trust another. The University of Texas study found that teams where the members had a propensity to trust in general (i.e., as personality trait) were able to exhibit swift trust. The implications from this study for industry are

that if a climate of trust is established in the firm, it should be easier for people to trust in general and to share knowledge among peers in an ever changing business environment where new alliances and changing partners are considered business as usual.

5 Establishing an Environment of Trust

How can a climate be established to foster trust, engagement in learning, and knowledge sharing in groups of individuals? The authors of the Texas study (Jarvenpaa et al., 1998) report that in addition to having a propensity to trust, virtual teams can attain trust by developing high levels of initiative, having a results orientation, and conducting their work genuine integrity. Flores and Solomon argue that "trust is the product of our relationships" (1998, p. 224). In other words, trust is not merely a "thing" that appears, they say, but a feeling that is cultivated by people taking responsibility to be trustworthy and trusting. Just as individuals can cultivate love (loving and being loveable) by acting in a loving way through small thoughtful gestures, they can also act in a trusting manner and instill trust by doing careful, timely, and quality work, by being responsive and fair in decision making and communication (Flores & Solomon, 1998; Husted, 1998; Shaw, 1997). Acting in a trusting way engenders trust just as sharing knowledge helps in the building of knowledge and in creating a learning organization. According to Shaw (1997), organizational trust can come about by

- Using creative ways to elicit and present information,
- Presenting opportunities for the ongoing development of knowledge, and
- Having an environment that tolerates and encourages risk taking within the values of the organization.

Without a trusting environment, though, few are willing to take risks, and one could argue that without trust, employees would be less likely to even seek out information from others unless it is absolutely necessary. Knowledge sharing, then, would be highly unlikely.

5.1 Using Creative Ways to Elicit and Present Information: Case 1—Sharing Knowledge Through Café Conversation and Drama

One organization that serves as an exemplar of creative approaches to sharing knowledge is the Skandia Future Center, a division of the Swedish insurance company Skandia, created in 1996 by Leif Edvinsson in Stockholm in order to help the company break out of its current ways of thinking. Skandia is known for its innovative knowledge elicitation and dissemination practices. In one instance the company organized intergenerational teams that met in a "knowledge café" format. Each team had coffee and a laptop computer

available. They talked about the future of the insurance industry with one person keying in notes on the laptop; the notes were then transmitted to a central source. When all the notes were compiled, the company representatives gave them to a company of actors who then created a play that incorporated the essence of all the teams' ideas. The play was presented at a company wide meeting, a meeting that was memorable by all accounts. Employees are said to have remembered the accounting of their knowledge café long after they may have recalled any report, memo or printed material. Surely, the organizers of the knowledge café must have trusted that the employees and executives of Skandia would accept such a different approach to conversation and knowledge exchange because it was risky to present a "report" in such an unusual format (McNurlin & Sprague, 2002).

5.2 Presenting Opportunities for Ongoing Development of Knowledge: Case 2—Finding Knowledge Objects Through Metadata and Taxonomies

In large organizations it is common for different groups to perform similar tasks but not to share a common vocabulary. For example, marketing staff might do   .   .   .   .   , the legal department might perform   .   .   ,   ,   , and the corporate librarians might provide updated   .   ,   .   , ... Although there are slight differences in connotation in each of these activities, there is also overlap in the information retrieved and results found, but the staff members might not communicate with each other or even know what the other departments are doing. If these different departments wished to exchange information and learn from each other, it could be useful if they spoke each other's language, and in fact, if they are sharing their findings on an Intranet or internal Web portal, it would be useful to have a common language, especially one that could assist in metadata and indexing of knowledge objects.

In representing knowledge and knowledge objects in an organization the taxonomy can be used to good advantage, especially for re-use of knowledge objects. A taxonomy is a part of an organization's information architecture that categorizes the texts, digital files, narratives, interview transcripts, images, and other objects that are stored in an information or knowledge repository. This fulfills the dual needs of creating a common and shared vocabulary that allow individuals and groups to effectively retrieve files and to be able to trust the system where objects are stored. Without a taxonomy or index language, it is likely that potentially useful objects might be in the system but never be found. Data can be defined as a "set of discrete, objective facts about events…and is most usefully described as structured records of transactions" (Davenport & Prusak, p. 2), distinguished from information in that the latter "has meaning…. Not only does it potentially shape the receiver; it has a shape: it is organized to some purpose" (p. 5). Knowledge derives from information through the processes of comparison,

understanding consequences, establishing relationships, communicating and sharing with others about the information and gaining their insights and perspectives (Nonaka & Takeuchi, 1995; Davenport & Prusak, 2000; von Krogh, Ichijo, & Nonaka, 2000). Further differentiation of knowledge from information can be based upon justified true belief on the part of the knower, and the critical importance of context in the establishment of knowledge, that is, information is relatively context free whereas knowledge is totally context dependent (Blair, 2002). The dynamic, contextually based nature of knowledge is captured in Davenport and Prusak's definition:

> Knowledge is a fluid mix of framed experience, values, contextual information, and the expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms (1998, p. 5).

Since knowledge is built on information, it is critical that organizational members are able to access that information. Without a comprehensive, current, accurate taxonomy that is made visible and easy to access, information can languish and go unused. Most KM technology systems are complex and multi-faceted, and a high quality taxonomy can engender trust because it helps in the findability of information. In contrast, when users do not find what they need because access points are not plentiful nor sensibly assigned, trust is compromised. As Denise Bedford of the World Bank Group explains, "Understanding the various types and uses of taxonomies is important to building a fully functional KM system" (2004, p. 219). She goes on to claim, "Knowledge management architectures that are built around well-defined taxonomies will prove sustainable and extensible as technologies advance to be effective, maintainable" (2004, p. 222).

These taxonomies serve as catalogs or indexes for the information that can feed into systems that are necessary for mission critical work. They are the provenance of the librarian or information professional who has studied the organization of knowledge and information cataloging, and also dependent on the subject matter experts to whom the specialists turn for grounded understanding of the domain-specific knowledge that underlies any useful, and consequently utilized, taxonomy. Renata Gorman, a New Jersey based knowledge management consultant who has worked in several large U.S. financial organizations, says that the taxonomies and metadata used to organize portions of knowledge objects, can function well in online learning programs where organizational members access the learning systems. One file might be connected to several different learning modules, and the metadata is the thread that connects similar concepts and ties together topics that relate to each other (Gorman, 2004).

5.3 An Environment that Tolerates and Encourages Risk Taking: Case 3—The Mixed Message Given by Expertise Locators

There are many factors that create an environment of trust within an organization from open communication and honesty to humane personnel policies, and Shaw (1997) argues that encouraging risk-taking and experimentation is also necessary. In a business setting decisions often need to be made quickly, but if there isn't support for risk-taking, managers and others will be stymied by the fear of being punished for making the wrong decision. Shaw says,

> . . . high-trust organizations give people the freedom to fail and then deal effectively with the failure when it occurs. The ability to get through difficult times, to support people when they are vulnerable, can build trust as much as anything else does (p. 149).

Although everyone will make a mistake at some time or another, we hope to soften the difficulties by minimizing problems and decreasing the likelihood that mistakes will be made. One way to establish an environment of trust is to help people find others in the organization who can give advice and offer suggestions in the face of new tasks or new projects. The traditional way is to create organizational "yellow pages" when the employee is first hired by having a questionnaire that can be completed with the new person's interests and expertise, and then the information on the form can be entered into a database so that organization members can contact each other. This system is fine, as far as it goes, however, people develop new interests and knowledge areas as their tenure progresses, and the yellow pages can reach obsolescence quickly, thus limiting its usefulness.

"Expertise locators," software that dynamically finds areas of expertise by scanning documents, e-mail, and electronic discussions, is a more dependable way to locate someone who can be consulted for focused advice. Researcher Kate Ehrlich at Viant Corporation points out that sometimes the best answer to sharing knowledge is finding a trusted advisor through an expertise locator because the locator can help "individuals develop better awareness of 'who knows what" (Ehrlich, p. 139). When an individual acts within the supportive advice of a more experienced individual, the worker feels less isolated and is acting in concert with an organizational expert.

The irony here, though, is that even though finding a trusted advisor is desirable, the way expertise locators work is to "look over the shoulder" of workers by having the system scan personal communication, meeting minutes, e-mail, other online discussion, presentation slides, reports, and manuscripts, in other words, whatever exists on the hard drive. It is commonly known that e-mail in organizations, especially in industry, is monitored, but the practice of searching all of someone's files and communication being searched for "expertise" is somewhat disconcerting, and seems to belie an environment of trust. So, one could argue that the yellow pages approach to listing expertise

areas, with all its imperfections, is preferable to standard expertise locators. Yellow pages can always be updated, even though it takes time and money to do so.

In summary, the kind of organization that cultivates trust is one that elicits and presents information, encourages the ongoing development of knowledge and learning, and fosters risk-taking. A learning organization with active knowledge sharing is the ideal, but who shall organize information that comes from meetings such as those in the knowledge café described above? And who shall organize the taxonomies that make artifacts accessible and findable? In addition, where will the expertise profiles originate, and who will manage the information and their currency? One answer to these questions might be the information service staff. The next section of this paper is a discussion of research that studied knowledge management in large organizations in New Jersey and the findings that relate to trust and the role of information professionals in creating a knowledge sharing environment.

6 Knowledge Sharing in Organizations—Research Results from a Study of KM in New Jersey Companies

A university research team sought to learn about the role of information professionals (i.e., specialized librarians, information managers, etc.) in facilitating knowledge sharing and knowledge management in large organizations in New Jersey. After reviewing current literature on knowledge management and knowledge sharing the researchers identified a sample of information professionals in organizations that would be invited to participate. The sample was identified from a population that consisted of a group of 89 very large companies in New Jersey with revenues of over $1 billion per year as identified by the Dun & Bradstreet Million Dollar Directory. This list was cross checked with the Official New Jersey Directory of Libraries and Information Centers in order to find names of information professionals in these companies to whom the survey would be sent. Because all the companies in the original sample did not have information centers listed in the Directory, the final mailing of potential research participants contained 40 organizations. Later, members of a local chapter of the Special Libraries Association (SLA) were asked to participate via a web-based survey. Typically, information professionals who work as corporate information professionals, information services managers, or as corporate librarians are members of the SLA. The researchers assumed that the SLA members from the targeted organizations would have a global view of the organization and would be logical participants in a knowledge management effort in the firms.

In the interest of full disclosure, it should be noted that the research was not originally focused on trust as it relates to knowledge sharing. The intention was to learn about the role of information service professionals in systematic knowledge management programs in the selected companies. The qualitative

and quantitative data from this study were examined to find evidence of trust and knowledge sharing as well as the more explicit results on information professionals' participation in the KM practices.

6.1 Theoretical Constructs and Problem Statement

There is a tradition of librarians and information scientists as KM managers. Corporate librarians follow the tradition of the profession in organizing and indexing representations of knowledge, and for the last two decades or more, they have been making as much information as possible available electronically. Today this usually involves creating and maintaining Web portals and doing detailed searching on proprietary databases as well as dealing with internal reports and miscellaneous information such as lab notebooks and conference proceedings. (Broadbent, 1998; DiMattia & Oder, 1997)

Trust and knowledge sharing in corporations has been explored by a number of researchers including information scientists (Huotari & Iivonen, 2004; Larsen & McInerney, 2002; Streng, 1999), philosophers (Bowie, 1999; Jones and Bowie, 1998), and management consultants, (Shaw, 1997), all of whom find that trust is an antecedent for learning related to information exchange, especially in organizations that depend on virtual workplaces. Much of the scholarly work in the KM field focuses on either _____ or _____ _____. In this study the researchers were interested in learning how KM programs were actually planned and implemented in large organizations. Another goal was to see if _____ and other information professionals were playing a role in the planning and operation of KM. Therefore, the research questions for the exploratory study were:

- **RQ1** What _____ _____ are being utilized in commercial organizations?
- **RQ2** What are the _____ being realized?
- **RQ3** What are _____ in their development and on-going support?

As was stated previously, trust was not a primary question in the study, but it emerged as an important issue as the research progressed.

6.2 Methodology

A self-administered questionnaire was developed that contained questions relating to the development of knowledge management practices, the support for the programs, and the involvement of information professionals in those practices. The survey instrument sought to develop as detailed a description as possible of the organizational elements that influenced the success or failure of such efforts: use of formal and informal programs, levels of funding, support from senior management, the roles played by librarians

and information technologists, the use of consultants, and, importantly, the role played by human resource management policies, including rewards and recognition that might facilitate the exchange of organizational knowledge. A pilot study of the survey was conducted by each research associate who asked a working professional to complete the survey and to offer advice for improvements. After the pilot results were analyzed, information professionals in the identified population of companies received a postcard indicating that a survey questionnaire would follow. A revised paper questionnaire and cover letter were prepared and mailed to each firm in care of the director of the corporate library or information center. A Web-based survey incorporating the cover letter was sent via e-mail.

Responses were received from the following types of firms: telecommunications, petrochemical, manufacturing, materials science, pharmaceutical, and food products. Fourteen of those surveyed completed a questionnaire indicating that their corporation had a formal knowledge management program. Of those who responded to the survey, individuals from five organizations indicated that they would be available for follow-on, in-depth, interviews. Interviews were recorded and transcribed verbatim. The interview data were then analyzed and coded in accordance with grounded content analysis theory (Strauss & Corbin, 1998).

It is not the intention of the authors to give a complete report on this preliminary study of knowledge management programs in New Jersey; however, they do wish to report on the qualitative and quantitative results of this study that point to factors of trust related to establishing a favorable climate for knowledge sharing. The results showed that librarians or other information services professionals played important roles in supporting KM/KS programs, but their work was not central to knowledge sharing and knowledge management initiatives. Other individuals were perceived as being more important, e.g., information technologists, the Chief Information Officer, and/or senior management.

At a summary level, all of the fourteen organizations showed some level of engagement in formal knowledge management programs (Table 1) with the methods used most often being tele- and video-conferencing for information exchange and e-mail for the distribution of information to targeted audiences (12 organizations). Half of the organizations indicated that they have formal knowledge management programs. Informal methods of knowledge sharing included general-use e-mail and instant messaging and bulletin boards. See Table 1 for detailed results of the types of KM/KS methods used.

Assessment of the organizations' planned and unplanned benefits was done through a seven-point Likert scale; Fig. 1 indicates the perceptions of the benefits by participants completing the questionnaire. The most significant planned benefits were improved information flow (mean of 4.43), capture of potentially lost knowledge (mean of 4.33), and improved access to organizational knowledge (mean of 4.07). The lowest average score was 3.00 for both better management decision making and improved manufacturing. The

Table 1. Utilization of Formal and Information Knowledge Management Strategy

Type of Strategy	Formal or Informal	Number of Organizations with Programs
Breakfast meetings	F	3
Other formal programs	F	4
Formal knowledge sharing programs	F	6
Use of facilitating groupware	F	7
Structured meetings	F	7
E-mail distribution of news	F	12
Tele- and video-conferencing	F	12
Chat rooms, forums	I	3
Other informal programs	I	5
Bulletin boards	I	6
E-mail and instant messaging	I	11

only unplanned benefit with a score over 4.00 was general awareness (4.21). General awareness may seem insignificant, however, if organizational members can become aware of knowledge sharing and knowledge management, that is a step in the direction of increasing the useful knowledge in an organization as well as the initial stage in the change process.

Participants also noted that unplanned benefits were accrued through the use of knowledge management programs. Additionally, information was collected about the factors that contributed to the success of the programs (Fig. 2). In this question, a score of one indicated "negatively impacted," a
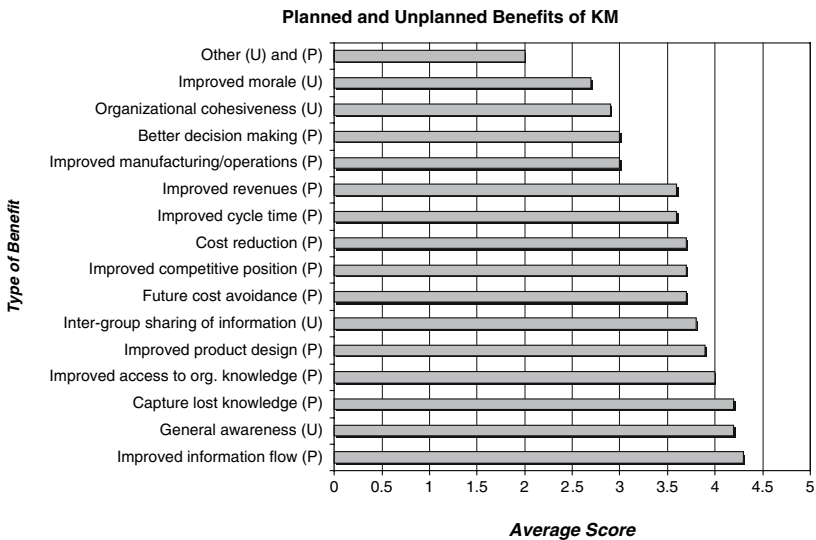
Fig. 1. Assessment of Planned and Unplanned Benefits
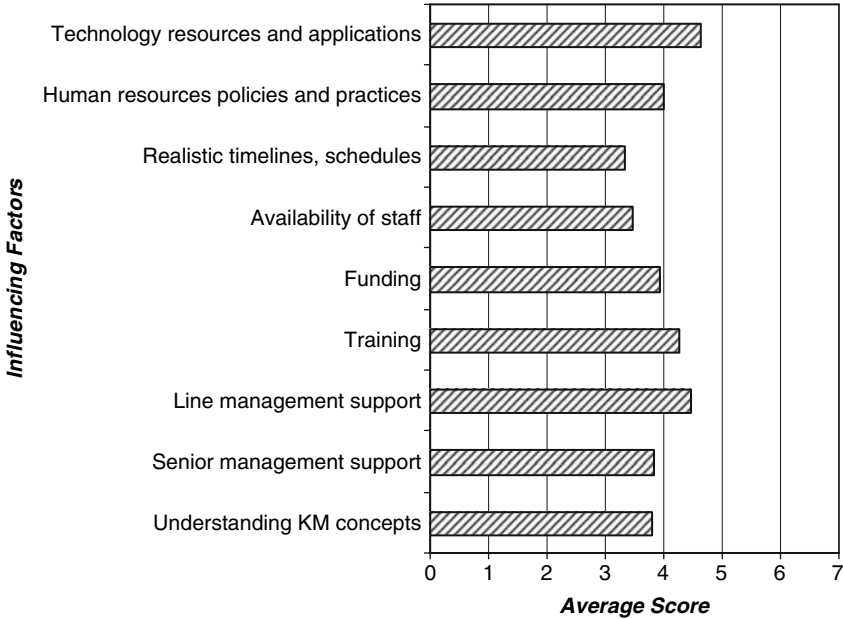
Fig. 2. Factors Influencing KM Program Development

score of four indicated "neutral" and a score of seven indicated "positively impacted." The three benefits that received the highest average scores, and the only ones with positive influences, were technology resources (4.64), line management support (4.46) and human resource practices and policies (4.0). The lowest average score was 3.33 for realistic timelines and schedules indicating some negative impact of these factors on the development effort.

Few extrinsic rewards were present for knowledge sharing in these organizations. On a Likert scale from one (no rewards) to seven (extensive reward systems), the average response was '2' with only three organizational representatives marking '4,' indicating some utilization of rewards. These results bolster the argument presented earlier that knowledge sharing is done based on the good will of the individual with the main rewards for knowledge sharing being intrinsic ones where the person sharing the knowledge feels good about being able to do it. Similar to research on trusting and trust-worthy behavior, those who have a personal ethic of sharing also exhibit behavior that demonstrates the willingness to share knowledge within an organizational setting. The presence of knowledge communities may be a contributing factor, with knowledge exchanged through the reciprocal contributions of members.

The interview data yielded rich results, especially concerning how the organizations collaborate and share knowledge. Taxonomies emerged as significant in the information systems being able to represent knowledge

objects adequately and accurately. The interviewees indicated that to sustain knowledge management/knowledge sharing programs, managers would need to establish clear linkages between the KM/KS program and the strategies and objectives of the larger organization.

As to the question of a climate of trust, the following dialog ensued between an informant at a large telecommunications firm and the researcher.

          : What about rewards and recognition? Are there incentives for people to share information? Is it an organizational or institutional belief that you ought to share? Are people encouraged to work in communities?

          : We have these values, there are a set of values that we have developed as a company so, this is our DNA, and as part of that, we have sharing your knowledge, learning, which is very, very close, to make sure we're doing the right thing. It's part of the DNA, so it's part of the . . . values. At this point there's no formal recognition of knowledge sharing, but it's part of it, it's implied.

          : Were there any issues related to sharing information that can demonstrate trust across organizational boundaries, across the business? Was trust ever an issue?

          : With us, it's more like, we are a very, very personal organization, and we talk about this all the time. We like to talk face to face. We like to communicate. We like to get together. So there is no problem with trust, we trust talking to each other. What the problem was, was capturing what we were talking about, and sharing that.

The responses here indicate that the organization has a climate of knowledge sharing (it is ingrained in the organization), and they have trust among one another. The information professionals, however, had problems with knowledge sharing, because knowledge artifacts could not be re-used. There was not an effective system in place to do that. A large barrier was already overcome—the environment of trust. With some help and commitment, no doubt, systems could be put in place to help the staff save some representations of what is learned in documents and other means of expression and make them accessible to all.

Issues related to trust and the sharing of knowledge are not always expressed in exactly those terms, however, but may be discernable in participants' descriptions of actual knowledge sharing behaviors in organizations. Several of the interviewees talked about the role of informal information sharing sessions that were often conducted over coffee. These sessions occasionally gained the status of a regular meeting, but they were not formalized into scheduling tools like online calendars. The value of these

meetings is revealed in comments such as "...several of the research groups do that (informally meet), like on a Friday afternoon, they'll just wander in and people talk about what's going on," clearly implying a level of trust in the other members of the knowledge sharing community where trust is implicit in the open exchange of information   . The characteristics of communities of practice, noted by McDermott (1999), include an open exchange of knowledge among members as an integral part of the fabric that binds work communities together. Enabling technologies can facilitate conversations that can only take place virtually when communities are not geographically proximate, replacing afternoon coffee and dialog with electronic discussion groups   . These dialogs also implicitly reflect the level of trust that exists in organizations and would not take place without the perceived conviction and support of middle and upper management.

7 Implications for Practicing Managers

Management leadership can play an important role in the willingness of associates to share knowledge. This can be done directly through expression of support, deployment of appropriate supporting rewards and recognition programs, and through support for the needed organizational and technological infrastructure that would allow knowledge communities to flourish. The organizations that participated in the interviews for this study showed perceptions of value in each of these approaches. In some cases this was through expressions of direct support, for example, "...that was a Leadership Team mandate (to share information) in response to employees' desire to know more about the company that they work for"   . In other cases it was through provision of the needed financial resources for the development of taxonomies and other supporting infrastructure, such as instant messaging   .

Taxonomies can be particularly useful tools that allow development of a shared vocabulary where one may not already exist. For example, in high technology organizations the research staff that deals with analog technologies may not use the same technical terminology as those engaged in work with digital technologies; but there may be important points of intersection in the groups' research interests; and a taxonomy may allow the terminology gulf to be spanned.

Not all barriers to the exchange of information are necessarily easy to overcome. Where interests may not be aligned, for example, across research teams dealing with different research and development activities, the sharing of best practices or other potentially useful information, even within the same parent organization, may not take place easily. "I think there's still a lot of

sharing that goes along across research. I know people want to share . . . but I don't know how much sharing goes on , truly," and then in response to a follow-up question, paraphrasing the comments of associates who would be engaged in knowledge sharing, "I don't want to share it 'cause this is my product development, this is my patent, this is my, my my . . . ." . . . . In situations of mergers and acquisitions, management support for information sharing may become problematic when the newly acquired organization proves to be uncooperative about sharing information easily. Despite efforts by the acquiring company to deal with associates fairly and openly, there can be misunderstanding about the need to quickly evaluate all the assets of the acquired company including the so-called "intellectual property" that exists as tacit knowledge in the employees . . . .). These examples reinforce the importance of trust as a critical factor enabling these types of knowledge sharing. As noted earlier, this level of trust needs to be established by being visible throughout the organization, ubiquitous in its application, and representing the engagement and support of the senior staff (Davenport & Prusak, pp. 34–35).

8 Limitations of the Research

The main limitation of this research is that it was conducted to learn about KM practices in large organizations, but not with the explicit purpose of examining trust in knowledge sharing. It was conducted to investigate "on the ground" knowledge management and knowledge sharing programs in large organizations, but some of the data does speak to the issue of a climate for knowledge sharing.

9 Conclusion

This paper makes an argument for focusing on trust and trustworthiness as key elements in creating a favorable climate for knowledge sharing efforts. It has been the authors' intent to discuss trust and knowledge management on a theoretical level, but also to use examples from real case studies and interviews with information professionals who are engaged in knowledge management practices. Although trusting resides in individuals, organizations can cultivate trust through policies that demonstrate respect and integrity, actions of chief executives and managers who carry out these policies, and information and communication practices that are fair and responsible. The words of Huotari and Iivonen (2004) might be heeded in this regard when they state,

> . . . building trust-based partnerships with other organizations will be
> the major managerial challenge in the globalized economy because

organizations are no longer able to succeed alone. Partnership building means the pooling of intellectual capital of collaborating partners, and this demands trust (p. 22).

Knowledge sharing can not be presumed in a context of competition and capitalism. With adequate environments of trust, however, learning can take place to help organizations achieve satisfying alliances and to function innovatively and productively.

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The Practice Gap:
Barriers to the Diffusion of Best Practices

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Abstract: Based on a review of selected literature, this chapter identifies and explains three categories of potential barriers to the intra-organizational transfer of best practices. The first category is the organizational context, including institutional and organizational environment, absorptive capacity, competency traps, identity, culture, and size. The second category is related to the diffusion process itself: stages of diffusion, attributes of the innovation, the recipient, and the knowledge to be transferred, and the state of relationship between the source of knowledge and the receiving unit. The third category includes management-related barriers, such as the level of managerial commitment and the appropriateness of training and reward systems. Common strategies for facilitating best practice transfer are reviewed and research propositions are derived.

1 Introduction

Knowledge is a key source of competitive advantage; firms must be able to identify and capture knowledge inside and outside their boundaries to be successful (Kogut & Zander, 1992; Winter, 1987). One such source of competitive advantage are best practices. Best practices are defined as "those practices that have been shown to produce superior results; selected by a systematic process; and judged as exemplary, good, or successfully demonstrated" (American Productivity and Quality Center, 1999).

The transfer of best practices has been identified as one of the most important managerial issues of the late 1990s (Earl & Scott, 1999; Szulanski, 1996). The proliferation of information and communication technologies has fueled organizational interest in the possibilities of knowledge management (Chumer, Hull, & Prichard, 2000). Knowledge management has become somewhat of a "buzzword," and the recent appearance of new knowledge-related management positions such as the "CKO" (Chief Knowledge Officer) (Earl & Scott, 1999) illustrates organizations' growing concern over being able to identify and transfer knowledge. More than half of European best-practice organizations surveyed by the American

Productivity and Quality Center reported that their strategic goals include knowledge management (Competitive Intelligence Magazine,1999). Best practices benchmarking and transfer is an important aspect of organizational improvement and knowledge management (O'Dell & Grayson, 1998).

However, while "It seems sensible to expect that, once uncovered, the example set by an inhouse center of excellence will be readily emulated by other units of the organization" (Szulanski, 1995), best practice transfer is often unsuccessful. Organizations often fail to "know what they know" (Huber, 1991; O'Dell & Grayson, 1998) or fail to translate knowledge into action (Pfeffer & Sutton, 2000). The implementation of best practices in general within an organization is typically slow and painful, marked by resistance, incomplete implementation, and failure (Pfeffer & Sutton, 2000). Hiam (1993) points out, for example, that while continuous improvement methods are integral to TQM, "a majority of TQM practitioners are not using these methods, [even though] firms using them achieve better results than firms that do not" (Hiam, 1993, p. 5). A survey of over 1600 managers in major US companies reported that while nearly a third of the companies had formal knowledge management programs, only half of them seem to have any real impact or activity (Management Review, 1999). Zuckerman and Buell (1998) conclude that actually transferring best practices (in the form of knowledge management) may simply require more training and ability than most managers have. Yet, little research has been done on the issue of best practice dissemination and implementation in organizations.

This chapter reviews and builds on selected literature from multiple fields to offer a more comprehensive account of the possible barriers to the transfer and implementation of best practices. It is intended both as a guide for the management practitioner who needs to identify such potential barriers in organizations, as well as a basis for exploring future research possibilities in bridging organizational knowledge gaps. We formulate research propositions based on each barrier that can lead to empirical research on the transfer of best practices.

The first step in identifying potential barriers to best practice transfer is to look at the specific organization in which the transfer is taking place. We identify contextual factors that can act as barriers to the identification, diffusion, and implementation of best practices: institutional factors, organizational environment, control vs. learning orientation, absorptive capacity, success, organizational identity, culture, and size. Once contextual barriers have been identified, one can focus on barriers related to the diffusion process itself: stages and network roles, attributes of the innovation, recipient and source, and their relationship, and characteristics of the knowledge to be transferred. Successful best practice transfer, however, goes beyond the diffusion process and implies the full integration of the practice into the recipient unit's activities. The third part focuses on management-related barriers to the retaining and integration of the practice: managerial commitment to the best practice, the appropriateness of the reward system, and training.

Factors Generating

Barriers and Facilitators   Levels of Occurrence
Outcomes
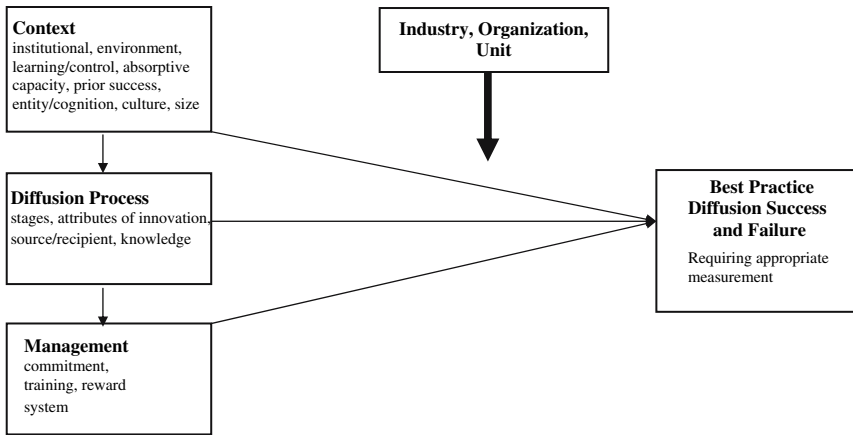
Fig. 1. Organizing Framework—Summary Model of Sources of Barriers and Facilitators to Diffusion of Best Practices, Moderated by Level of Occurrence

Figure One summarizes the organizing framework for these factors, the levels at which they tend to occur, and the general extent of best practice diffusion. The chapter ends with a brief review of proposed strategies for the internal diffusion of organizational knowledge, and a list of propositions for future research.

2 Contextual Factors: Characteristics of the Organization

Actors seeking to transfer and implement a best practice must consider various characteristics of the organization that can act as barriers or enablers of transfer: institutional context, environment, control vs. learning orientation, absorptive capacity, competency traps, identity, culture, and size.

2.1 Institutional Factors—Industry, Organization, and Unit Levels

We propose that there are three levels of institutional factors that can act as a barrier to the internal transfer of best practices: the industry level, the organizational level, and the unit level. At the industry level, institutional theory stipulates that isomorphism occurs between organizations of the same industries (DiMaggio & Powell, 1983). Legitimacy becomes a driving factor in innovation diffusion (O'Neill, Pouder, & Ruchholtz, 1998) across organizations. Therefore, even if an organizational unit has developed a best

practice and is ready to diffuse it across the organization, other units might reject the practice if the industry has not recognized it as "best." Conversely, historical, regulatory, and economic factors may, by chance, provide an early benefit to one practice that generates increasing returns and benefits from positive externalities, so that other practices become "locked out" (Arthur, 1989) even if they are in many ways superior.

Institutional factors also exist at the organizational level. Certain practices become institutionalized by the organization to the point of becoming a symbol of organizational culture, acquiring a "rule" status and becoming extremely resistant to change (Oliver, 1992). If a new practice developed within the organization threatens to remove a highly institutionalized practice, its diffusion is likely to be arduous. In this case, the old practice must be deinstitutionalized before a new one can be implemented (Oliver, 1992). Favorable conditions for changing a highly institutionalized practice in favor of a new one include political pressures (questioning the legitimacy of the old practice by a growing number of organizational members, performance crisis, decreased dependence on institutional constituents), functional pressures (technical re-evaluation of the usefulness of the practice, loss of rewards for the practice, conflict between performance criteria and the practice, dissonant information from the environment), and social pressures (loss of cultural consensus, changes in industry/regulatory environment that discourage the use of the practice, geographical dispersion in the institutional environment) (Oliver, 1992). However, the institutionalization of a new best practice can in turn be a barrier to the transfer and implementation of newer, more appropriate ones (Winter, 1994), as discussed below in the section on "Prior Success."

The third level of institutional factors takes place within the organizational unit. Specific units have their own degree of institutionalization of certain practices, which can act as a barrier to the successful implementation of a practice coming from another unit. Groups tend to minimize sources of conflict and foster homogeneous thinking, rejecting "threatening information" that is contained in an innovation such as a best practice (Van de Ven, 1986). Units can be geographically dispersed from the rest of the organization and be subject to different environmental institutional forces. Units also have their own professional cultures that can be shaped by their professional affiliations. Kostova (1996) found that the success of best practice diffusion is higher when the institutional environment of the recipient unit is supportive of the practice. Furthermore, the institutional distance between parent company and the receiving unit is negatively associated with diffusion. Kostova's measure of institutional distance was based on differences of national cultures between the parent company and the foreign receiving unit. However, one could expand this research to the effects of institutional distance on best practice transfer between units of different professional cultures, for example, between the sales department and engineering. Indeed, numerous firms are attempting to make various units as similar as possible to reap the benefits associated with internal

best practice transfer (Argote, 1999). Decentralization can reduce the amount of transferable practices across units: "differences across groups are likely to be accentuated by providing groups autonomy in deciding how to accomplish their work and by encouraging them to develop their own culture and task-performance strategies" (Argote, 1999, p. 178). However, making units too similar could ultimately hinder the creation of new, unique knowledge. Decentralization is also necessary to maintain organizational flexibility in a turbulent environment. Firms thus have to achieve a delicate balance between standardization and local adaptation when transferring best practices (Argote, 1999).

2.2 Environment

Uncertainty

Attributes of the organizational environment can influence best practice diffusion. The level of environmental uncertainty faced by the organization influences its propensity to innovate: organizations operating in a highly certain environment do not see the benefits in changing what already works. Organizations operating in highly uncertain environments, however, have to discard practices and adopt new ones rapidly to meet environmental changes (O'Neill et al. 1998) and are more prone to innovation. Therefore, once a best practice is identified in an organization operating under conditions of high environmental uncertainty, it is more likely to be diffused quickly to other organizational units. In this case, the capacity to identify, recognize, and use new knowledge is directly tied to organizational survival, providing a compelling reason to adopt a best practice. In the extreme case of crisis (overwhelming uncertainty), however, organizations tend to revert to the most fundamental principles and responses, close down informal communication channels, and centralize authority (Staw, Sandelands, & Dutton, 1981). Thus, there is likely a U-shaped relation between uncertainty and innovativeness. Cause-and-effect relationships are more difficult to establish in uncertain environments (Sitkin, Sutcliffe, & Schroeder, 1994). This ambiguity can lead the organization to transfer ineffective practices and fail to identify and transfer the "best" ones, or fail to tie best practice to improved performance.

Control Versus Learning Orientation and Environment

Sitkin, Sutcliffe, and Schroeder (1994) proposed a contingency approach to the implementation of TQM which can be applied to best practices. Their discussion distinguishes total quality control (TQC), or conformance to requirements, which is best under low environmental uncertainty, from total quality learning (TQL), emphasizing adaptability, best under high environmental uncertainty. TQC enables the organization to focus on existing processes, improve them and bring them under the highest control possible

(Soin, 1992). However, under conditions of high uncertainty, these processes are constantly changing and the organization must keep up with the changing environment through the gathering of new knowledge. Therefore, TQL practices are used to increase organizational knowledge "by learning from ongoing experimentation" (Khurana, 1999, p. 91). Similarly, March (1991) considered the exploitation/exploration trade-off. Exploitation (improvement) of existing processes is relevant in low environmental uncertainty; exploration is best suited to high environmental uncertainty because changes in the environment make established processes no longer appropriate.

Therefore, best practice transfer and implementation must follow the contingency of environmental uncertainty. Best practices geared toward the control of existing processes make sense in low environmental uncertainty, but would most likely fail to be effectively implemented in an organization operating under conditions of high environmental uncertainty. Similarly, best practices focusing on innovation and risk-taking will be more easily implemented in conditions of high environmental uncertainty. However, organizational environments will never be completely stable or completely uncertain, which is why organizations must be able to implement the right amount of best practices focused on control and on learning. This delicate balancing act between exploration and exploitation is what Cole (1999) calls "the Learning Paradox": organizations learn from experience and existing processes, yet established routines inhibit exploration of new ones.

2.3 Absorptive Capacity

Knowledge creation in organizations is cumulative and path dependent (Alange, Jacobson, & Jarnehammar, 1998): organizations build upon previous knowledge to acquire new knowledge. The state of an organization's knowledge is a good predictor of its ability to recognize and use new knowledge within the organization. This is a function of absorptive capacity, which is a firm's ability to recognize and use new information resulting in higher competitiveness (Cohen & Levinthal, 1990), and is largely dependent on the firm's previous knowledge (Alange et al. 1998; Cohen & Levinthal, 1990; Fiol, 1996). A firm's absorptive capacity can be translated as an "enthusiasm for knowledge" and "drive to stay ahead in knowledge" (Leonard, 1995). Organizations with a high absorptive capacity typically encourage risk-taking, fostering experimentation and, ultimately, learning from a new practice or strategy (O'Neill et al. 1998). In the case of the internal transfer of best practices, therefore, one has to consider the absorptive capacity of the organization as a whole, but also of work units that are the possible recipients and users of the new knowledge (Szulanski, 1996).

However, this very same absorptive capacity can create a barrier to the implementation of new practices. The path-dependent nature of technological change has been documented by several researchers (Arthur, 1989; Rosenberg, 1994). Socio-historical contexts favor the selection of specific technologies over

others. Future decisions of technology selection are based on past decisions and their implications, resulting in a path-dependent process of selection and adoption. The path-dependency of the innovation process can cause organizations or units to become locked in a specific path of innovation and become unable to integrate knowledge or practices that differ from that path (Alange et al. 1998). Absorptive capacity must therefore be able to break from previous paths of innovation.

2.4 Prior Success

Organizational diffusion and adoption of best practices can be conceptualized as forms of organizational learning (Huber, 1991). Although the concept is not easily defined (Garvin, 1993), organizational learning is an extended process through which organizations learn, grow, change, adapt, and improve in order to remain viable. Paradoxically, one of the obstacles to diffusion of best practices is successful learning, especially the prevalence of routines and organizational memory, which evolve from past experiences (Levitt & March, 1995) and are embedded in unrecorded procedures and individual cognitions (Walsh & Ungson, 1991). Best practices from other organizations or units must become part of these routines and memories, or are easily ignored, rejected, or re-interpreted.

According to Sitkin (Sitkin, Sutcliffe, & Browning, 1996), one liability of success is that highly successful firms foster complacency and homogeneity, and an over-reliance on existing best practices, thus hindering the creation and implementation of new knowledge. This dilemma is called the "competency trap" (Cole, 1999), or "core rigidities" (Leonard, 1998), as high competency at existing processes acts as a barrier to change. People are naturally reluctant to trade successful practices for new ones (Leonard, 1998; Van de Ven, 1986). Successful organizations also act as change barriers by enforcing homogeneity through standardized hiring and retention practices. Leonard (1998) gives the example of the American automobile industry, which had been so successful with its existing practices that it failed to recognize the threat of Japanese automakers. However, once the American auto industry had successfully emulated the Japanese and closed the production gap, the Japanese fell in their own "competency trap." Instead of reinventing themselves, they reinforced their reliance on previously successful practices, hence further losing their competitive edge. Similar dynamics take place within the firm between various units: successful units will have a difficult time trading their previously successful practices for new ones.

Sitkin et al. propose an alternative to the complacency trap associated with prior success: strategic failure. Strategic failure advocates the use of organizational learning through experimentation, as small failures challenge the status quo by acting as a powerful, easily interpreted signal for the necessity of change. However, if prior success can be a barrier to change, it is also necessary for successful change. Organizational members need to

associate success with the new best practice, as an increased sense of success leads to increased experimentation and openness to change (March, Sproull, & Tamuz, 1991). Successful organizations integrate new components by building on previous ones, because learning occurs through connecting the new with the old (Cole, 1999) as part of the path-dependency of organizational change (Alange et al. 1998).

Another, more subtle, obstacle is the nature of learning that may take place: first-order (single-loop) or second-order (double-loop) learning (Argyris & Schon, 1978; Weick, 1969). Single-loop learning is corrective and largely reactive, as it aims to bring conditions back within acceptable bounds, but not question the bounds or any processes whereby the learning took place. Double-loop learning is preventative and proactive, as it involves assessing and redesigning the very processes whereby learning take place. Encouraging double-loop learning will thus become a key managerial concern in best practice transfer (DeLong & Fahey, 2000). It may involve an ongoing process of learning and experimentation, rather than isolated reactions to perceived problems. Organizations or individuals focused on single-loop learning may evaluate a potential "best practice" as being oriented specifically to a perceived problem, and may not be able to re-orient the fundamental nature of its learning. Johnson and Rice (1987), for example, showed that organizational units that focused narrowly on single-loop efficiency criteria tended to suppress innovative conceptualizations and uses of word processing technology and practices.

2.5 Organizational Identity and Human Cognition

The problem of human cognition in interpreting change is another important contextual barrier to the implementation of new organizational practices (Van de Ven, 1986). A unit's own experiences are easily interpreted by the members of the unit, while experiences of another unit might be more difficult to interpret (Argote, 1999). Personal construct theory (Reger, Gustafson, Demarie, & Mullane, 1994) states that human beings organize data in a finite set of bipolar constructs, which are used to guide action. Organizational members might be unable to interpret change if it goes beyond their set of constructs. Allen and Brady (1997, p. 319) agree, claiming that " . . . programs fail if they depart radically from past conditions within an organization because employees cannot cognitively understand or support such radical changes." Acceptance of change occurs when constructs are incorporated into an individual's schema. The key is to incorporate rather than challenge fundamental identity schemas by making change gradual.

Reger et al. (1994) also discuss how organizational identity may be an internal barrier to change. Organizational identity is defined as the sets of beliefs held by employees about the organization. Organizational identity is created through shared interpretations (March, Sproull, & Tamuz 1991). Change is sought when the organizational identity no longer matches an

ideal organizational identity (Reger et al. 1994; Van de Ven, 1986). If the ideal identity is too close to the existing identity, change will be seen as unnecessary. If the ideal identity seems impossible to attain, change will be seen as useless. Best practices may represent fundamental challenges to organizational members' basic assumptions about the identity of their organization. Contradictory information is rejected as irrelevant, and the transfer of a best practice will fail if that practice can be interpreted as conflicting with the organizational identity. This is most problematic in organizations with strong and clear identities, which have "deeply ingrained and tacit assumptions" (Reger et al. 1994, p. 569) which foster cognitive inertia against changing existing schemas for sense-making and interpreting action and may prevent full understanding of new changes. Therefore, mid-range changes will be the most likely to be accepted.

For more major changes, it may be necessary to create new organizational identities that can be incorporated into and associated with members' current schemas. Reger et al. (1994, p. 574) suggest two strategies: developing a future, ideal organizational identity; using benchmarking and customer interaction to provide comparison organizations and instances of unattained organizational identity. Both approaches attempt to increase motivation toward changing cognitive schemas based on gaps between perceptions and images of organizational identity. A key goal in implementing organizational best practices is to create a shared interpretation of the practice that is consistent with the organization's identity.

2.6 Organizational Culture

Organizational identity is influenced by the organizational culture. Any attempt to diffuse a best practice must consider organizational culture as a possible barrier. The organization's culture establishes acceptable behavior and is very difficult to change. Organizational cultures and subcultures determine what is perceived as knowledge, and perceptions about what knowledge should be transferred and managed. For example, in an organization where billing the maximum work hours to clients is an important part of the culture, experimentation with new knowledge will be seen as detrimental and wasteful because the time devoted to that experimentation cannot be billed (without a change in organizational culture, practices, and rewards) (DeLong & Fahey, 2000). Similarly, a culture that values individual performance over knowledge sharing or that promotes the "Not Invented Here" syndrome can hinder the identification and transfer of best practices (O'Dell & Grayson, 1998). Becker (1993) and Westbrook (1993) argue that organizational-level cultural changes are required to foster diffusion and implementation of the TQM philosophy.

Unit subculture can also be a major barrier or facilitator of best practice transfer. The manager must again identify which unit subculture best fits the practice to be transferred, or how the unit subculture should be modified in order to increase adoption probability (DeLong & Fahey, 2000). Chang and

Wiebe (1996) in particular, find, from their study of quality award-winning organizations in Missouri, that organizational culture—both its orientation as well as its consistency across units—affects the extent of philosophical acceptance of TQM, and thus its diffusion and success. Note then that it is not just the culture of the adopting organization that is relevant, but also the extent of shared cultures within and across units or organizations, and interconnectedness among the actors, that influences diffusion.

The first question for the manager to answer is what the organizational culture is in terms of practices, norms, and values (DeLong & Fahey, 2000). McNabb and Sepic (1995) propose a multidimensional framework to assess organizational and unit culture. The interaction of culture, climate, and people is translated into processes, procedures, and policies that legitimize and direct the organization's work. Two measures of the integration of culture, climate, and policies toward change are employee performance and job satisfaction. Therefore, an important aspect of best practice transfer is to monitor employee performance and job satisfaction in the receiving unit. In turn, job satisfaction can lead to increased organizational readiness for change. The level of trust in the organizational and sub-unit cultures is related to ease of knowledge sharing: low trust cultures tend to resist knowledge coming from other organizations or units, and will hinder the best practice transfer (DeLong & Fahey, 2000). Consistent with Reger et al.'s discussion of mid-range changes, McNabb and Sepic argue that major change increases anxiety, lowering job satisfaction and performance. A key goal is therefore to implement changes so to keep anxiety at a minimum; another would be to adapt and expand the domains of satisfaction and performance to include best practice transfer.

Various sources agree that organizations that are successful at knowledge transfer tend to have a high-trust, risk-taking, knowledge sharing, change-embracing culture (DeLong & Fahey, 2000; Leonard, 1998; O'Dell & Grayson, 1998; Pfeffer & Sutton, 1999). However, an often forgotten cultural trait that may be crucial to knowledge transfer is the organization's ability to deal with paradox. Indeed, organizational learning entails the contrary forces of using prior knowledge effectively while being ready to discard it in favor of new knowledge (Lewis, 2000). An inability to deal with organizational paradoxes often results in increased anxiety and resistance to change (Lewis, 2000). As explained by Lewis, the best managerial strategy for innovation is transcendence (Watzlawick et al. 1974), or fostering paradoxical thinking in employees in order to move from single-loop learning to double-loop learning.

2.7 Organizational Size

Organizational structures can inhibit or facilitate change. Power structures and predefined roles can be a barrier to best practice implementation. Large organizational structures have the advantage of containing a greater pool

of knowledge and more resources to devote to the implementation of best practices. Large companies, being more complex, rely more on tacit routines to store knowledge (Winter, 1994). By relying more on knowledge represented in processes rather than individuals, the large organization is therefore less likely to see a best practice abandoned after implementation because of employee turnover (Winter, 1994). However, their size can act as a barrier to change. Because large firms rely heavily on routinized processes, they often fail to react quickly to environmental changes and respond too slowly to implement an innovative practice successfully (Dougherty, 1996). Their stability tends to "buffer the need to change" (Winter, 1994). Complex bureaucracies also tend to reinforce pre-defined roles (Dougherty, 1996; Johnson & Rice, 1987), which prevents organizational members from experimenting with a new practice and the associated role boundaries. Davenport and Prusak (1998) argue that the maximum organizational size for optimal knowledge management is around two to three hundred members.

2.8 An Industry Example of Contextual Barriers and Facilitators: The Case of ABB

Martin and Beaumont (1998) published a case study of best practice transfer in the multinational firm Asea Brown Boveri, from the headquarters to one of the subsidiary units. ABB was seeking to implement a time-based management practice called "7-ups." The first stage of the transfer attempt was difficult due to institutional distance between the parent company and the receiving unit. Employees of the unit perceived the practice as being irrelevant to local conditions. Local managers saw the new practice as being unfair for their specific plant. Thus both units had specific, and different schemas that did not match the proposed change. Based on Martin and Beaumont's discussion, there also seemed to be a mismatch between the environments that the parent and local companies were operating in. The subsidiary unit produced power transformers, operating in a stable and homogeneous environment. However, the company also operated in process automation businesses, which was a heterogeneous and uncertain industry. Hence, the company was trying to transfer a learning-oriented practice to a control-oriented unit, leading to increased difficulty of transfer. Furthermore, the authors point out that local managers saw the new practice as "an embarrassment or threat to their position and self-concept," pointing to the difficulty of reconciling the culture of the parent company and the unit. However, as local managers began to see substantial gains in certain areas of the company resulting from the implementation of the practice, they started to be more receptive to the transfer, and once local managers became champions of the practice, the transfer successfully took place.

3 Diffusion Process Factors

3.1 Stages of the Diffusion Process: From Identification to Continued Use

An important step in the transfer of a best practice is identifying what constitutes a "best" practice in the organization. Indeed, the biggest problem faced by organizations is a state of unawareness of the best practices available in the organization (Szulanski, 1995). Identifying what is "best" is a difficult task: "not only is 'best' a moving target [...], but 'best' is also situation-specific" (O'Dell & Grayson, 1998, p. 12). O'Dell and Grayson suggest labeling "best" as "those practices that have produced outstanding results in another situation and that could be adapted for our situation" (p. 13). Once a best practice has been successfully identified, the organization needs to facilitate its diffusion throughout the organization. Rogers (1983) suggests two main stages to the diffusion process of innovations. The first stage is marked by the adoption of the practice by a few innovators, who may be organizational cosmopolites. These employees have access to multiple resources inside and outside the organization and are not closely integrated in local peer networks. Therefore, cosmopolites, or boundary spanners, through their multiple contacts within and outside the organization, have an important role in identifying best practices that could be useful for a specific unit. Further, they may have more diverse schemas, and awareness of a greater variety of practices, than most organizational members. In the second stage, early adopters are employees who are highly respected by their peers and act as opinion leaders for the innovation. If early adopters are convinced to use the innovation, the adoption rate usually spreads through the rest of the organization or unit. Widespread dissemination of an organizational best practice can raise awareness of the practice among employees but is not sufficient to change their behavior toward using the practice (Rogers, 1995). Indeed, until early adopters set the example, the adoption rate is unlikely to take off. The extremely important role of these opinion leaders is explained by uncertainty-reduction theory: the main motivation for individuals to communicate is to reduce uncertainty (Johnson, Meyer, Berkowitz, Ethington, & Miller, 1997; Papa & Papa, 1992). Innovation creates uncertainty, which is reduced through communication with trusted peers in one's communication and task network, especially those who have had experience with the innovation (Rogers, 1995). Valente and Davis's (1999) "optimal matching" diffusion strategy proposes, and supports through computer simulations, that implementers can accelerate diffusion by selecting opinion leaders (ideally, through nominations from the community) and then matching community members to their "closest" opinion leaders, who provide legitimization, training and support.

Innovation networks may be both internal and external. At the individual-level within organizations, innovation adoption by lower-level users is often stimulated by higher level employees (who are sources of greater initial

resources), such as when managers adopt email first (Rice & Case, 1983). Papa and Papa (1992) reported that greater network diversity and size, but not sheer frequency of communication, influenced how and the rate at which employees learned to increase their performance using an insurance information query system. This finding is consistent with Granovetter's (1977) "strength of weak ties" argument, which suggests that innovations diffuse more rapidly through weak and diverse ties. At the inter-organizational level, Newell and Clark (1990) suggested that one of the reasons why British inventory and control system manufacturers were less innovative than comparable U.S. manufacturers was that they had less communication with external organizations, conferences, and associations. Organizations may learn from networks either directly, through its members and organizational experiences, or indirectly, by adding new members who have new knowledge and finding out about other organizations' experiences (Johnson & Rice, 1987; Levitt & March, 1995; Locke & Jain, 1995; Rice & Rogers, 1983; Simon, 1991). But new ideas must also be sought out in order for them to be adopted. Benchmarking as a fundamental activity in TQM is a specific form of proactive seeking of indirect learning from other organizations.

3.2 Attributes of Innovations, Recipient and Source, Knowledge, and Source-Recipient Relationships

Attributes of Innovations

Attributes of innovations can be thought of as facilitators or barriers to diffusion. Different attributes influence different stages of the diffusion process, such as rejection, acceptance, continued use, and reinvention.

The innovation must be perceived as compatible with previous organizational experiences for users to accept it (Agarwal & Prasad, 1997; DeLone & McLean, 1992; Moore & Benbasat, 1991; Rogers, 1983; Tornatzky & Klein, 1982). However, consistent with the newness-confirmation model of communication (Weizsacker, 1972 in (Wigand, Picot, & Reichwald, 1997)), the innovation should neither be too novel or too familiar: entirely new information cannot be acted upon because it cannot be linked with past experiences or fitted to existing schemas and practices. Information that only contains confirmation of past experiences is not an innovation and will foster no new action (Wigand et al. 1997). A large disconnect between sender and recipients' knowledge bases will be detrimental to transfer: "if the skill gap between partners is too great, learning becomes almost impossible" (Hamel, 1991, p. 97). Furthermore, a key predictor of acceptance of a specific innovation is the user's perception of the degree of external pressures to adopt it. When pressure is perceived as high, users will be more inclined to accept the innovation (DeLone & McLean, 1992; Moore & Benbasat, 1991).

The perceived complexity of the innovation is negatively related to its acceptance and continued use. If a best practice is perceived as being too

complex, organizational members will not adopt it (Rogers, 1983; Tornatzky & Klein, 1982). A practice's causal ambiguity, or the difficulty to link measurable results to its implementation, is a powerful barrier to transfer and was found in one study to be a more important factor than knowledge tacitness and complexity (Simonin, 1999). Transfer is facilitated by how easy to articulate the knowledge is (Bresman, Birkinshaw, & Nobel, 1999) and how easy it is to teach to others (Zander & Kogut, 1995) (what Rogers calls "communicability"). The best practice must also be high in trialability, which is the degree to which the innovation can be easily divided for experimentation, and in observability, which is the degree to which it can easily be seen by other organizational members to encourage further adoption (DeLone & McLean, 1992; Moore & Benbasat, 1991; Rogers, 1983). A difficulty for best practices is that the costs and benefits for the adopter are difficult to measure or even estimate: trialability and observability are lower for organizational innovations than for technical innovations (Alange et al. 1998).

The best practice's relative advantage, which represents the degree to which employees see it as superior to other possible innovations, must be high to foster both initial adoption and continued use (Moore & Benbasat, 1991; Rogers, 1983; Tornatzky & Klein, 1982). Furthermore, while the practice should not be too ambiguous, it should also be diverse enough to solve problems across the organizations' functional units (Lapre & Van Wassenhove, 2001).

Cool, Dierickx, and Szulanski (1997) note that previous diffusion models are not adequate for intraorganizational diffusion because they assume equal opportunity to adopt among members of the social system. For organizations, supply factors are also important because they create unequal adoption opportunities among organizational members. For example, a supply factor can be the relative cost of the innovation. At the inter-organizational level, an organization might not have the financial capabilities to support the implementation of a new best practice. Similarly, at the intra-organizational level, it might be too costly for a unit to adapt a best practice from another unit to its particular context.

Attributes of the Recipient and Attributes of the Source

Attributes of the recipient, knowledge, and source-recipient relationship may also affect the diffusion of best practices. Szulanski (1995) found that the better a unit is, the less likely it is to adopt a new best practice, a manifestation of the NIH (not invented here) syndrome. However, the very best units within an organization are also the most open to trying out new best practices, and have greater absorptive capacity (Szulanski, 1996). Ideal targets for transfer are therefore poor or excellent performing units. It should be noted that although unit influence is an important predictor of initial acceptance, the influence of group uses and attitudes on individual continued use tends to disappear over time (Kraut et al. 1998).

The source of the best practice should be a successful unit. Research on imitation across organizations has shown that firms will more readily copy practices of a successful firm than an unsuccessful one (Argote, 1999; Haunschild & Miner, 1997). Concerning internal transfer of best practices, if a unit is striving to be successful, it makes more sense to copy the practices of a successful unit. In copying the practice, units may seek not only success but legitimacy. This is linked to the previously mentioned concept of institutional isomorphism (DiMaggio, 1983), which suggests that firms imitate the practices of industry leaders in a search for legitimacy.

Source-Recipient Relationship

The third most important barrier found by Szulanski was a difficult relationship between the source of knowledge and the receiving unit. This result points to the importance of trust in knowledge transfer. Trust in source-recipient knowledge relationships can be affected by the "status of the knower" (Davenport & Prusak, 1998) in relationship to the recipient. Certain organizational cultures value some categories of employees over others, with the result that certain sources of knowledge are favored over others (Davenport & Prusak, 1998). Some organizational cultures tend to foster intergroup competition by evaluating performance through comparison across units, ultimately limiting the possibility of knowledge sharing between groups (Argote, 1999; Kramer, 1991).

Another variable known to influence source-recipient relationship and the outcome of transfer is geography. Although still inconclusive, research findings suggest that knowledge travels more rapidly and more easily between units that are located in proximity to one another (Argote, 1999; Epple, Argote, & Murphy, 1996; Galbraith, 1990). Research on regional economies also show that knowledge travels more easily to closer locations (Jaffe, Trajtenberg, & Henderson, 1993; Almeida & Kogut 1999). Possible cultural differences between units that are farther apart should also be considered (Kostova, 1996).

The source of the transfer will have to gain awareness of the unit members' concerns in adopting the innovation. Typically, users of a new innovation have three concerns: how will the innovation affect performance, how does it fit with the local culture and norms, and how much uncertainty will it trigger (Lewis, 1997; Lewis & Siebold, 1996). Initial communication channels between source and recipient are a predictor of innovation transfer success: getting information to the recipient unit in the beginning of the transfer was found to be more important than getting participation and feedback (Lewis, 1999).

Attributes of Knowledge

The manager concerned with best practice transfer must evaluate where this knowledge resides within the organization. While this may seem like a simple task, knowledge most frequently is embedded in multiple organizational

components: people (Starbuck, 1992), often working as groups in sub-networks, as well as products, tools and technology (Argote & Ingram, 2000). Successful transfer may involve moving people, tools and technology from the sender to the receiver.

The second most important transfer barrier found by Szulanski was another attribute of the transferred knowledge: causal ambiguity. Causal ambiguity occurs when cause and effect relationships between knowledge and productivity results are difficult to identify. Van de Ven (1986) points out to the difficulty of managing part-whole relationships: linking the innovation to organizational outcomes. It is often difficult to measure how a best practice really affects organizational outcomes because of the high content of tacit knowledge and constant redefinition in the diffusion process (Alange et al. 1998). O'Dell and Grayson (1998) suggest focusing initial efforts of best practice transfer on critical business issues that have high payoff and are aligned with organizational values and strategy, and focusing on areas where dramatic performance improvement is linked to an underlying process. Once organizational members are convinced of the value of best practice transfer by an obvious cause-and-effect instance, they are more likely to support subsequent, more causally ambiguous, transfer.

Other attributes of knowledge that act as diffusion barriers within organizations are its leakiness and stickiness (Brown & Duguid, 1991). Work practices are embedded in communities of practice. This locally embedded knowledge is "sticky," meaning that it does not travel easily across communities of practice (Brown & Duguid, 1991; Brown & Duguid, 1998; Orlikowski, 2002). Organizational practices are difficult to imitate across departments and conditions because they involve the transfer of tacit knowledge (Brown & Duguid, 1991; Brown & Duguid, 1998; Cole, 1999; Nonaka, 1994; Polanyi, 1967). Extended communities associated with professions (i.e., communities of practice) lie across firm boundaries. Diffusing knowledge among groups with similar professions is easier than moving it across heterogeneous groups within a firm (Brown & Duguid, 1991; Davenport & Prusak, 1998). Thus knowledge may travel more easily between organizations (knowledge is leaky) than within organizations (knowledge is sticky).

The Nature of Organizational Knowledge and the Difficulty of Measuring Best Practice Transfer

Even when a unit has learned how to use a new practice, imitating is made difficult by subtle differences in conditions (Cole, 1999). An appropriate transfer process goes beyond imitation, and also includes reinvention, or the adaptation of an innovation after adoption (Cole, 1999; Johnson & Rice, 1987; Rice & Rogers, 1983). Because each division comprises its own local conditions, a pervasive barrier to knowledge diffusion is a perceived lack of fit

of the practice with the specific work practices of the divisions (the innovation attribute of "perceived compatibility" (Rogers, 1983)).

Another barrier to the diffusion of best practices lies in the definition of what constitutes successful transfer. Because the diffusion of tacit knowledge involves reinvention, the transfer process itself is difficult to measure: the definition of the practice can change as the organization changes (Winter, 1994). One could even argue that the practice is altered every time it is absorbed by a different adopter (Alange et al. 1998). Indeed, the initial advantage of the best practice can be lost in the alteration process (Alange et al. 1998). One way to measure transfer success and the level of alteration of the practice is to assess the velocity of the transfer, which represents the relative speed at which the transfer has occurred, and the viscosity of the transfer, which is how much of the knowledge intended for transfer has been successfully absorbed by the recipient (Davenport & Prusak, 1998).

However, it is sometimes impossible to make tacit knowledge explicit enough for complete transfer. Epple et al. (1991) note that the transfer of know-how is never complete, because some knowledge remains in the heads of the employees and is not transferable. Therefore, the best way to transfer knowledge across divisions is to move knowledgeable employees. Berry and Broadbent (1987) have found that even though these knowledgeable employees cannot explicitly articulate the tacit knowledge, they can apply tacit knowledge to a different task, making "personnel movement a powerful transfer mechanism" (Argote, 1999, p. 176).

3.3 An Industry Example of Diffusion-Related Barriers and Facilitators: The Case of HP

In the 1980s, Hewlett Packard started the process of importing Total Quality Management practices from its YHP subsidiary based in Japan. Because YHP's successes with Quality were so prevalent, HP employees recognized the practice as "best" and established a trustworthy relationship with YHP during the transfer (Cole, 1999). However, because of the ambiguous nature of knowledge, it was difficult for HP employees to connect the Japanese productivity results with Total Quality Control (TQC) practices. Hence, many HP managers resisted the transfer of TQC, arguing that there was no link between TQC and productivity. Fortunately, top management championed the initiative and success stories attributable to TQC, and the transfer was completed successfully (Cole, 1999).

4 Management-Related Factors

Once barriers linked to the organizational context and the diffusion process have been overcome and a practice has made it from one unit to the other, managers need to worry about the recipient unit retaining the practice.

Successful transfer entails a complete integration of the practice into the recipient unit's daily processes. This is where management-related factors are the most important in best practice transfer.

4.1 Managerial Commitment

Some researchers suggest that the type of employee determines the necessity of managerial intervention. Consistent with previous research (Leonard-Barton & Deschamps, 1988), Astebro (1995) found that the adoption of an organizational innovation was positively related to management involvement for employees who tended to be late adopters, had low skills, were poor performers, were less likely to perceive their task as important and more likely to think that innovation adoption had little relevance to their job performance. Therefore, one must consider characteristics of employees of the receiving unit for assessing the impact of managerial commitment in best practice transfer.

A lack of managerial commitment has been identified by the TQM and innovation diffusion literature as one of the most important barriers to organizational change (Brown, Hitchcock, & Willard, 1994; Covin & Kilmann, 1999; Crosby, 1996; Winter, 1994). For effective transfer of best practices, leaders need to consistently champion the message of knowledge sharing for the greater good of the organization (O'Dell & Grayson, 1998). Allen and Brady (1997) found that in two organizations implementing TQM, organizational commitment and perceived organizational support were higher, there were more positive employee-top management and coworker communication relationships, and more quality information from top management. Also, these explained more variance in organizational commitment and perceived organizational support than in the one non-implementing organization. In discussing the results, Allen and Brady suggest that "positive employee-superior communication relationships may be important because superiors articulate an organization's values and goals, describe how employees can reach these goals, and establish a departmental climate personifying positive aspects of the employee-organization relationship in the absence of clearly articulated messages from top management" (1997, p. 335).

However, Molinski (1997) warns about the dangers of putting too much emphasis on commitment. Molinski presents three paradoxes of change. The first is that "Change needs to be managed, but management inhibits change" (p. 314). Without managerial commitment, change won't be implemented. However, the innovation runs the risk of becoming associated with a specific leader or division and thus suffer from "sponsorship bias," inhibiting adoption throughout the organization outside of the sponsor's unit (Molinski, 1997). This is especially important for best practice diffusion: if the best practice becomes too closely associated with a specific leader or division, it is likely to be perceived as non-transferable to other organizational units, or to be abandoned should that leader leave the organization.

The second paradox is that "change needs committed leaders, but too much commitment diffuses and dilutes the change" (p. 316). An overemphasis on commitment to change by management can overwhelm organizational resources and detract employees from accomplishing their work. Beyond championing best practice transfer, managers must act to implement them: implementation can get lost in meetings and documents (Pfeffer & Sutton, 1999). Furthermore, multiple change projects also tend to confuse employees, suggesting that best practices should be implemented one at a time. Too many change projects can also lessen the outcome of any change by diluting organizational resources; an organization can only invest in a finite amount of change at a time (O'Dell & Grayson, 1998).

The third paradox Molinski warns against is that "change needs rhetoric, but rhetoric inhibits change." Simard and Rice (2006) apply Mintzberg's (1980) managerial roles to suggest ways for the manager to foster knowledge sharing and learning in TQM implementation. The manager needs to act as a liaison, fostering networks of knowledge sharing between employees and units that can be conducive for best practice transfer. The manager also needs to act as an opinion leader, encouraging trust-building communication activities which encourage risk-taking.

4.2 Training

Another barrier to implementation particularly emphasized by the TQM literature is a lack of training. Epple et al. (1991) found that the amount of knowledge carried forward from one unit to the next is linked to large investments in training. Brown et al. (1994) identify two causes for training failure. The first is unrealistic expectations. Rogers (1983) specifies that an innovation should be compatible with existing values and experiences. Therefore, if an employee lacks sufficient previous experience to successfully link his work to the innovative practice, training is likely to be ineffective. The second cause is training that is not tailored to the audience. Rogers also warns about the degree of perceived complexity of the innovation by employees, which negatively influences its rate of diffusion. If training is too complex for a category of employees, the practice will not be understood. Other causes of training failure is the lack of applicability of training to the employee's daily work and a lack of opportunity for building experience with the new work practice. Again, Rogers points out that an innovation should easily be "trialable" as part of the employee's daily work, and that is should be compatible with the employee's work experience. However, some best practices can require higher cognitive abilities, technical knowledge, and problem solving abilities. In some cases, training will not be sufficient and the organization may have to modify jobs to fit employee ability, with the participation of the employees (Stone & Eddy, 1996). Further, fostering more complex applications or reinvention of a best practice requires training that emphasizes conceptualizations of the practice, rather than just technical

operations or routine uses. For example, training can emphasize that word processing may be the foundation for document management and transfer instead of simple text input (Johnson & Rice, 1987), or voice mail can support dynamic collaboration instead of just asynchronous message storage (Rice & Danowski, 1993). Brown et al. (1994) suggest five ways to assess the adequacy of training in regard to a new best practice: availability of resources for training, frequency of training, number of employee levels enrolled in the same training sessions, number of employees trained, and satisfaction of employees with overall training.

4.3 Reward System

Also at the managerial level, the issue of the inappropriateness of reward systems is pervasive in the TQM literature. Inappropriate rewards can lead to implementation failure. Even if the practice was successfully transferred, a failure to adapt the corresponding reward system could mean premature abandonment of the practice. Several authors warn that outdated appraisal methods are a barrier to TQM implementation, especially where competition is rewarded over cooperation, and individual results over team results (Brown et al. 1994; O'Dell & Grayson, 1998; Pfeffer & Sutton, 1999).

The difficulty of achieving the right balance between team and individual rewards is a major barrier to best practice implementation. Thompson (1998) notes that the paradox of rewards in TQM is the necessity to reward team work while maintaining a good performance climate for individuals. Thompson prescribes a delicate balancing act by the manager to effectively reward teams and individuals at the same time, focusing on individual performances within teams. Three factors should be considered: specific job performance, productivity of the team, and individual contribution to the team. Similarly, individuals, as well as teams, must be rewarded for sharing and using best practices. Management must exercise caution when asking employees to give up personal rewards, which can lower commitment to the change (Winter, 1994).

The use of performance appraisals can also act as a barrier to best practice implementation. While they provide information on job performance and necessary improvements, they can put too much emphasis on short-term results, institute fear and distrust among employees, and be incongruent with organizational quality goals by focusing on people rather than on process improvements (Stone & Eddy, 1996). A focus on results from the best practice—especially early on, when users are attempting to understand, learn, and apply the practice—will most likely cause fear of using the practice and inhibit experimentation with the practice.

The difficulty and necessity of matching individual and organizational goals in reward systems is also important, which means that organizational members should have their input in reward system formulation (Stone & Eddy, 1996). However, Winter (1994) notes that individuals must be ready

to sacrifice short-term goals for the benefit of the organization in TQM implementation, even while the new best practice can entail higher uncertainty in the form of job reorganizations and new role definitions. Therefore, management must make clear to the employees that they will receive some other, or long-term benefits for their sacrifices. Winter (1994) also warns that the best motivation for implementing TQM is a perceived threat to the organization's survival, in which case employees will be more willing to sacrifice short-term individual rewards in favor of organizational goals. In the case of best practice transfer, not only a threat to the organization's survival but also a perceived threat to the receiving unit's survival could serve as a lever to the adoption of a new practice. As noted above, however, in extreme crisis situations, individuals, groups and organizations are less likely to try out new practices (Staw et al. 1981).

The reward system needs to be matched with the orientation of the best practice (control vs. learning—Simard & Rice, 2006; Sitkin et al. 1996). In what Carson and Stewart (1996) call traditional TQM (Total Quality Control), management creates control systems aimed at improving and maintaining quality, with specific roles assigned to employees and clearly defined expectations. In this case, it makes sense to reward individuals on the basis of those clearly defined expectations and statistical results in quality improvements and customer satisfaction. Applied to best practices, this would mean, in a control environment, rewarding individuals on using a practice of quality improvement based on clearly defined expectations. However, if organizational adaptability and learning is the goal (as in Total Quality Learning), individuals should be rewarded for experimenting with the practice, changing or reinventing it, and even failing at it (Johnson & Rice, 1987). In the case of Total Quality Learning (Carson & Stewart, 1996; Sitkin et al. 1994), where exploration is the main focus of the employee's work, management should deemphasize hierarchical control and reward risk-taking, which also means recognizing the benefits of failure (Sitkin, 1996).

Hackman and Wageman (1995) warn about a risk of motivation discrepancy between the few workers who are part of quality teams and take part in best practice formulation, transfer, and implementation, and the rest of the employees who do the work according to practice specifications over which they have little say. Members of a knowledge production unit who have taken part in the creation of knowledge have more intrinsic motivation in sharing it (Osterloh & Frey, 2000). The implementation of best practices must therefore consider the motivation to use the best practice, especially for employees who had little say over the design, transfer and adaptation of the practice.

Organizations must also achieve the right balance between extrinsic and intrinsic rewards in best practice implementation. According to Goodale, Koerner, & Roney (1997), intrinsic rewards are important to successful best practice implementation. They found that customer service employee empowerment significantly increased the quality of service delivered to customers. If the best practice contains a high level of intrinsic rewards

for employees, such as higher empowerment and job satisfaction, it will therefore be more likely to be successfully implemented. O'Dell and Grayson (1998) also point to intrinsic rewards as the key to get employees to use the practice. Hackman and Wageman (1995) warn about the dangers of extrinsic rewards in TQM implementation. Pay-for-performance can put too much emphasis on specific outcomes and cause employees to lose sight of the "larger picture." For best practices, this means that a monetary reward for using the best practice can lead employees to misuse the practice. In that case, employees might decide to use the practice in a situation no longer appropriate for it, especially problematic in the case of ongoing changes in the environment. Also, receiving monetary incentives to use a practice can discourage any attempts to experiment with the practice, taking risks, and bring improvements to the practice, since the reward is associated with a specific definition of the practice. Furthermore, pay-for-performance tends to diminish the rewards of intrinsic motivation by placing too much emphasis on financial goals. Encouraging employee competition for a pool of monetary rewards can also pose a threat to team work rewarding and undermine work relationships (Hackman & Wageman, 1995). However, intrinsic rewards alone may not be enough for TQM and best practices, so organizations must achieve an appropriate balance between intrinsic and contingent extrinsic rewards (Hackman & Wageman, 1995).

One of the most crucial kinds of rewards for effective best practice transfer are diffusion-related rewards, or knowledge sharing to foster best practice transfer between units. However, O'Dell and Grayson (1998) warn about the use of artificial rewards for diffusion: knowledge sharing has to be supported by the organizational culture and be rewarding in itself, such as through a sense of contributing to the greater good of the organization, increased work efficiency, and recognition from peers. O'Dell and Grayson (1998) conclude that successful firms focus on embedding knowledge and practice transfer into their employees' work methods and recognize employees for their contributions. A difficult issue faced by organizations seeking to reward knowledge sharing is how to evaluate the quality and impact of the knowledge being shared to match rewards to the contribution. Furthermore, today's knowledge workers, faced with waves of reorganization and downsizing, can feel that their job security is dependent on their personal level of knowledge and be very reluctant to share that knowledge, perceiving it as a loss of "competitive advantage" over other organizational members (Davenport & Prusak, 1998).

4.4 An Industry Example of Management-Related Barriers and Facilitators: The Case of Texas Instruments

In 1994, Texas Instruments began its best-practice transfer efforts. From the start, top-management championed the initiative, formulated an organizational vision around best-practice transfer, and modeled the desired

behavior. A specific group at Texas Instruments was in charge of providing continuous support and creating reward systems in tune with the new practice. Texas Instrument's efforts are viewed as a managerial success-story in the transfer of best practices (O'Dell & Grayson, 1998).

5 Strategies for Diffusing Best Practices

As Table One summarizes, this chapter has reviewed selected literature to offer a picture of the most common barriers to the implementation and diffusion of organizational best practices. Faced with this multitude of potential barriers, how can the organization successfully identify, transfer, and implement best practices? A review of all possible strategies is not within the scope of this chapter. Identifying the possible barriers, as exemplified in Table One, is the first step in developing necessary means to overcome them. However, some authors offer practical advice on how to overcome diffusion-specific barriers.

Since best practices contain some degree of tacit, "sticky" knowledge located in the minds of individuals, transferring people should be the most effective way to transfer knowledge (Argote, 1999). Brown and Duguid (1998) propose the identification of key individuals and boundary objects as strategies for the internal diffusion of knowledge. The first strategy is to identify translators and opinion leaders who can help in the diffusion process. Translators are individuals who have the ability to frame one division's interest in terms of another division's perspective. These individuals are meant to overcome the stickiness of knowledge, whereby knowledge does not travel easily across communities of practice (Brown & Duguid, 1991). Translators should have sufficient knowledge of the different communities and have the trust of the different communities (Brown & Duguid, 1998). Other key individuals who can be used in the transfer process are knowledge brokers. These individuals are loosely linked to several communities and can facilitate knowledge flows between communities.

Boundary objects can also serve as bridges between communities. Boundary objects are those artifacts, metaphors, and objects "held in common across different parts of a . . . community, but which are adapted to customized use" (Star, 1993, p. 93). Useful "boundary objects," according to Star, are plastic enough to adapt to local contingencies, yet robust enough to maintain common identity, becoming more strongly structured in local use. Star's typology of boundary objects includes (1) repositories (ordered sets of objects indexed in a standardized way), (2) ideal types (some general metaphor or map good enough for all participants to use), (3) some shared terrain, whether physical or informational, and (4) forms and labels (common terms or formats that avoid or ignore locally specific information). For example, the same technology can be used differently ("reinvented") by different communities or units. These boundary objects can serve as linking points in the transfer of best practices. Business processes can also be used as boundary

Table 1. Barriers and Facilitators to the Transfer of Internal Best Practices: Institutional, Diffusion Process, and Management Factors, at Industry, Organizational or Unit Levels

Factors	Levels	Barriers and Facilitators
Institutional		
Institutional Forces	Industry Organizational Unit	F: practices legitimized by institutional environment B: practices that detract from institutionalized values or existing institutionalized practices B: when institutional distance between source and recipient is high
Environment	Industry Organizational Unit	B: stable environments foster status quo B: when practice orientation (control/learning) is not adapted to environment F: dynamic environment drives motivation for change
Control vs. Learning Orientation	Organizational	F: match practice orientation with environmental uncertainty B: mismatch of practice with environmental uncertainty
Absorptive Capacity	Organizational Recipient Unit Individual	F: organizational culture facilitating learning B: when innovation lock-in happens B: when organization and unit have low absorptive capacity
Prior Success	Organizational Unit Individual	B: success encourages competency trap F: the very best units are more open to change; Individuals need to experience success associated with experimentation
Organizational Identity and Human Cognition	Organizational Unit Individual (human cognition)	B: practices beyond individual constructs and radically detracting from org. identity will be rejected. F: changes geared toward attaining ideal org. identity and changes that can be interpreted by human cognition (shared interpretation)

Table 1. (continued)

Factors *Institutional*	Levels	Barriers and Facilitators
Culture	Organizational Unit Individual (job satisfaction)	B: dictates acceptable behavior B: low job satisfaction and low employee performance is associated with the practice F: best practice is consistent with existing culture F: high job satisfaction and high employee performance is associated with the practice
Firm Size	Organizational Unit	B: stability inhibit change B: large bureaucracies reinforce pre-defined roles F: more resources to support implementation F: large firms rely on processes—best practice transfer is less affected by employee turnover
Diffusion *Process-Related*		
Stages of Diffusion	Unit Individual	F: early adopters B: early adopters do not use the practice
Attributes of Innovation	Individual	F: best practice has high compatibility, low complexity, high trialability, high observability, high perceived advantage, mid-range newness, low relative cost B: the practice has low compatibility, extreme or no newness low trialability, low observability, high complexity, low perceived advantage and high cost
Source-Recipient Relationship	Unit	F: high trust B: low trust F: high levels of shared experience B: high geographical distance
Nature of Knowledge	Unit Individual	B: causal ambiguity; knowledge tacitness/knowledge stickiness B: low perceived fit of practice to local conditions F: low causal ambiguity F: high perceived fit of practice to local conditions F: knowledgeable employees are involved in transfer

Table 1. (continued)

Factors	Levels	Barriers and Facilitators
Management-Related		
Managerial Commitment	Organizational Unit Individual	B: lack of commitment B: too much commitment F: employees who are late adopters, have low skills, perceive new practice as unrelated to performance F: manager acts as a trust-builder
Training	Unit Individual	F: ongoing, adaptive, conceptual training B: best practice is not compatible with previous experience; practice is not trialable; training is not tailored to audience, degree of perceived complexity is too high
Reward System	Unit Individual	F: alignment of individual, unit, and organizational goals; Intrinsic reward associated with best practice; adequate balance of team and individual reward B: extrinsic rewards are overemphasized B: individual and divisional competition is favored over cooperation B: rewards are not adapted to orientation (control/learning) of the practice

objects: one function of organizational processes should be to enable groups to align themselves with one another and with the organization (Brown & Duguid, 1998). Thus, enabling processes should involve boundary objects that encourage negotiation and knowledge sharing between communities (Brown & Duguid, 1998).

Other strategies for encouraging knowledge sharing between units are to provide sharing incentives, emphasize competition with other firms, and focus not on internal organizational boundaries, but on higher level boundaries between organization and environment (Argote, 1999).

O'Dell and Grayson (1998) review the most commonly used methods for best practice transfer in organizations. The first is the use of benchmarking teams, who are responsible for evaluating the current state of an organizational process, identify gaps, and search for best practices aimed at bridging that gap outside the company. These teams can also be used to perform internal benchmarking: an internal organizational unit might already be a leader in that best practice and outperform other organizations. The second strategy is the use of best practice teams, which are designed to encourage knowledge sharing between individuals of similar levels from various part of

the organization. These teams usually consist of managers who meet quarterly. The third method is knowledge and practice networks. These knowledge networks usually occur within communities of practice and are often aided by information technology (O'Dell & Grayson, 1998). The key is to provide opportunities for interaction between organizational members from various units (Argote, 1999).

Information technology (such as best practice databases, intranets, and online discussion lists) can serve as support for best practice sharing but does not represent a solution in itself (O'Dell & Grayson, 1998). Developments in IT have created much hope for knowledge management and knowledge transfer. O'Dell and Grayson (1998) suggest matching the knowledge with the technological solution. The most "valuable" and tacit knowledge is located within individuals, implying a low-tech transfer solution. Computer databases are appropriate to transfer data and highly explicit knowledge, but highly valuable and ambiguous knowledge is best transferred through people. These people-enabled sharing platforms include discussion groups, internal assessments and audits, such as "share fairs," to identify knowledge gaps and serve as platforms for knowledge sharing (O'Dell & Grayson, 1998). Corporate intranets, social networking programs, and wikis represent the latest IT-enabled support for knowledge sharing, but the real benefits of intranets in best practice identification and transfer are still undocumented.

6 Conclusion: The Need for a Holistic Approach to Best Practice Transfer

This chapter has offered a review of the literature from the fields of best practices, total quality management, organizational learning, knowledge management, and diffusion of innovations to discuss the barriers to the internal implementation and diffusion of organizational best practices. We have divided the barriers to the transfer and implementation of best practices in three equally important categories: factors of the firm and its environment, factors linked to the diffusion process, and management-related factors, each to some extent constrained or influenced by the prior category. Research suggests that higher implementation success is associated with a tendency for organizational members to over-anticipate potential barriers to implementation (Lewis, 2000). Therefore, using the framework depicted in this chapter, the manager can gain increased awareness of potential barriers to best practice transfer.

First, the manager concerned with best practice transfer has to evaluate the organizational context in which the transfer will take place. Does the organization already possess absorptive capacity? If not, organizational members will have little ability and incentives to identify and transfer new knowledge within the organization. The manager can evaluate the forces of

institutional factors within the organization. Is the practice to be transferred seen as legitimate? Is the previously used work process highly linked to the organization's culture? Old practices can become institutionalized to the point of being very difficult to replace, acquiring a "rule"-like legitimacy status within the organization. In that case, the biggest problem might not be the practice to be transferred, but the practice to be replaced. Is the institutional environment of the recipient unit supportive of the practice? Units that show a strong attachment to a specific professional culture are more likely to resist a practice that is not recognized as legitimate by members of their professions. The manager must also be aware of the limits of human cognition and ensure that the transfer and implementation process is gradual, so that organizational members can interpret the change. The new practice must not challenge organizational identity too radically, and present itself as a mean to attain an ideal organizational identity. Is the new practice consistent with organizational culture? Measurements of performance and employee satisfaction will be two important ways to measure transfer success. Is the organization too big and slow to implement a new practice successfully? Complex bureaucratic structures enforce pre-defined roles and inhibit experimentation with a new practice. However, if the organization is small, does it have the resources to spend on the transfer and implementation of a new practice?

Considering possible barriers linked to the diffusion process, the manager should focus efforts on early adopters, who are key in achieving a critical mass of best practice users, especially for non-substitutable practices that generate increasing returns, and opinion leaders, who have the power to convince others (either explicitly or implicitly) to use the best practice. The best practice itself should be seen as superior to others by organizational members, and should be compatible with previous experiences of the members of the receiving unit, without being too redundant with previous practices. The practice should be easy to observe, and to try, by members of the receiving unit. The receiving unit should ideally be one with poor performance or one with extremely high performance with a high degree of absorptive capacity. The source of the best practice should be perceived as successful. Attributes of the knowledge to be transferred should also be considered. If the practice contains high levels of tacit knowledge, transfer will be difficult across heterogeneous groups. Furthermore, high levels of causal ambiguity between the best practice and organizational outcomes represent an added barrier to successful transfer. The relationship between source and recipient unit is another important potential barrier. A relationship emphasizing trust over competition will facilitate the transfer. Finally, the practice itself should be perceived as compatible with the local conditions of the receiving unit.

Then, evaluating management-related barriers, the manager will first have to assess his or her own commitment to the best practice, as well

as the commitment of his or her peers. Managers must adapt their intervention in the implementation of the practice to the needs of different employees. Employees with low skills and lower performance levels are the most important target for managerial involvement in best practice implementation. However, too much emphasis on managerial commitment can be detrimental to change. If a best practice is too associated with a specific manager, it will probably be seen as non-transferable to other organizational units. Too much managerial commitment to change can overwhelm organizational resources and dilute the effect of a single change initiative. Too much emphasis on change rhetoric can foster skepticism on part of the employees and inhibit adoption of a new practice. The role of the manager is to act as a liaison and opinion leader, fostering the creation of knowledge networks and knowledge sharing and trust-building activities between units. Training with the new best practice will be an important influence on transfer success. If employees are not properly trained in using the practice, it is likely to be abandoned. Training should be tailored to the employees of the receiving unit, should be compatible with employees' previous experiences, should make the innovation easy to try and experiment with for employees, and should at some point emphasize conceptual bases of the practice. Similarly, reward systems should be adapted to the best practice. Managers need to achieve the right balance between individual and team rewards, and foster cooperation over competition. Performance reviews can inhibit experimentation with the practice, as can an overemphasis on extrinsic rewards. The most important type of reward for our discussion is rewards for sharing and using best practices.

Previous literature on best practice transfer and implementation has tended to focus on specific barriers within one of the three major categories identified here. The main contribution of this chapter is to offer the reader a comprehensive picture of the multiple possible barriers to the successful transfer of best practices. The first step in overcoming barriers to knowledge transfer is to become aware of them. An important conclusion to be drawn from this chapter is that each barrier can also become a facilitator of best practice transfer, depending on the context. This realization should be encouraging for practitioners, who should seek not only to overcome the barriers to best practice transfer, but, when possible, turn them into facilitators of transfer.

This review and organization of selected literature can serve as a model for empirical testing of the relative weight of all of the mentioned facilitators and barriers at various organizational levels. Based on the literature, the following research propositions offer some possible relationships between these multiple factors and best practice transfer success, and thus also potentially valuable future research venues.

Table 2. Forty-three Research Propositions

- 1: The higher the recognition of the practice as "best" by the industry and within the organization, the easier the transfer.
- 2: The higher the level of institutionalization of a practice within the organization or the receiving unit, the more difficult the replacement of that practice by a new one.
- 3: The higher the fit between the type of best practice to be adopted and previous best practices adopted by the unit, the easier the transfer.
- 4: The higher the institutional and geographical distance between source and receiving unit (i.e., the higher the level of decentralization), the more difficult the transfer.
- 5: The higher the level of environmental uncertainty, but less than crisis levels, the easier the practice transfer, due to higher motivation to change.
- 6: The higher the level of environmental uncertainty, especially in crisis levels, the more difficult the best practice transfer, due to the higher level of ambiguity in cause-and-effect relationships.
- 7: the higher the fit between best practice orientation (control/learning) and environmental uncertainty, the easier the best practice transfer.
- 8: The higher the level of absorptive capacity of a firm/unit (state of previous knowledge), the easier the best practice transfer to that firm/unit.
- 9: The higher the level of organizational complacency resulting from prior success, the more difficult the best practice transfer.
- 10: The higher the level of "change" associated with the best practice in individuals' perceptions, the more difficult the transfer.
- 11: The higher the fit between best practice and ideal organizational/unit identity, the easier the transfer.
- 12: The lower the level of shared interpretations about organizational identity, the harder the best practice transfer.
- 13: The higher the levels of employee performance and job satisfaction in the receiving unit, the more likely the new best practice will be retained.
- 14: The greater the resources available to implement change, the easier the best practice transfer.
- 15: The higher the level of bureaucratization of the organization, the more difficult the best practice transfer.
- 16: The higher the level of organizational reliance on individuals rather than processes, the more likely a best practice will be affected by employee turnover.
- 17: The earlier that a non-substitutable best practice which generates increasing benefits gains a significant set of initial adopters, the easier the later transfer.
- 18: The higher the adoption level from influential opinion leaders, the easier and faster the complete transfer.
- 19: The higher the level of trust between source and recipient unit, the easier the best practice transfer.
- 20: The more diverse an organization's internal and external innovation networks, the easier the identification and transfer of best practices.

(continued)

Table 2. (continued)

- 21: Best practices of mid-range newness will be easier to transfer than highly complex ones or highly familiar ones.
- 22: Observability and trialability are positively related to successful best practice transfer.
- 23: The better performing the unit is, the more likely it will suffer from the NIH syndrome, and thus the more difficult the transfer of a best practice to that unit. However, Best practice transfer to extremely successful units is easier than to simply successful units.
- 24: The higher the perceived success of the source of the best practice, the easier the transfer.
- 25: The higher the cost associated with the best practice transfer for the receiving unit, the more difficult the transfer.
- 26: The higher the level of tacit knowledge embedded in the best practice, the more difficult the transfer.
- 27: The higher the velocity and viscosity of the transfer, the more successful the transfer.
- 28: The higher the amount of knowledgeable employees involved in the transfer, the easier the transfer.
- 29: The higher the level of management commitment, the easier the best practice transfer when employees of the receiving unit have low skills, are late adopters, and are poor performers.
- 30: The higher the level of identification of the best practice with a single leader, the more difficult the transfer throughout the organization.
- 31: The higher the number of multiple change projects existing simultaneously in the organization, the more difficult the transfer of the best practice.
- 32: The higher the level of employee skepticism toward change, the more difficult the transfer of the best practice.
- 33: Trust-building activities by managers are positively associated with more successful best practice transfer.
- 34: Compatibility of the best practice with previous employee experience is positively related to training success in best practice transfer.
- 35: Trialability and applicability of the best practice as part of the employee's daily work is positively related to training success in best practice transfer.
- 36: Tailoring training to the audience is positively related to training success in best practice transfer.
- 37: Training that emphasizes the conceptual bases of the best practice is associated with more complete and diverse adoption of the practice.
- 38: A reward system encouraging competition and individual performance is negatively associated with more successful best practice transfer.
- 39: Employee and managerial readiness to sacrifice short-term goals is positively related with more successful best practice transfer.
- 40: A perceived threat to organizational or unit survival is positively related with more successful best practice transfer.

Table 2. (continued)

- 41: The existence of intrinsic rewards for knowledge sharing and using the practice is positively related to more successful best practice transfer. An overemphasis on extrinsic rewards for knowledge sharing and using the practice is negatively related to more successful best practice transfer.
- 42: Participation in the transfer and implementation of the best practice is positively related to adoption of the practice.
- 43: Organizational support for experimentation with the new practice is associated with more successful transfer over time.

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Can Organizations Really Unlearn?

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Abstract: The complex phenomenon of organizational change is a continuous challenge for scientists and for practitioners alike. Simple models tend to be regularly worn out by field evidence. More and more factors must be taken into account in order to ensure a better reliability of change models. A recently proposed solution suggests that learning theory should be placed more centrally within the theory of planned organizational change (Hendry, 1996; Schein, 1993; Kilmann, 1989). However, this research direction has already been broached, although under a slightly different perspective. Early studies (Starbuck and Heberg, 1976; Hedberg et al. 1976) have shown that organizational change should initially go through an unlearning phase. The elimination of old, obsolete organizational knowledge—that is, unlearning—makes room for the development of new adaptive capacities (Hedberg, 1981; Nystrom and Starbuck, 1984; Hedberg et al. 1976; Markoczy, 1994; Starbuck, 1989).

This paper reviews the different conceptualizations of the unlearning process in the research literature. The integration of these various perspectives allows inferring that organizational unlearning is mainly apprehended as a tool for the removal of inefficient behavior in favor of an adaptive one. A subsequent analysis of the intimate bonds between organizational knowledge and actions (Pfeffer and Sutton, 1999; Kuwada, 1998; Klein, 1989) shows that other knowledge manipulation processes may have the same behavioral effect. Two new processes are proposed. Knowledge inactivation and rivaling enforced enactment eliminate undesired behaviors by altering the perceived validity and, respectively, the operational capacity of underlying organizational knowledge. All together, unlearning, rivaling enactment, and knowledge inactivation are labeled as knowledge neutralization phenomena.

The article concludes over the place of the newly proposed class of processes in a change context. It is argued that, although the neutralization of old knowledge is not imperative for learning, its behavioral effects provide support for organizational change. Furthermore, knowledge inactivation, rivaling enactment, and unlearning seem to fit in specific organizational settings, according to the time and resources available. An analysis of management literature uncovers latent evidence for these findings (Lorsch, 1986; Starbuck and Laudon, 1996; Carmona and Grönlund, 1998).

1 Introduction

Organizations face recurrent cognitive inertia. While they cope with unexpected and unwanted change, organizations may adapt through somatic change, but most of their knowledge lies unaffected. Eventually, the very same knowledge that led them to previous success may turn out to be the very source of their next disaster. Nystrom and Starbuck (1984) suggested that organizations should allocate part of their resources to "unlearning" in order to avoid further and recurrent organizational crises. Little is said however on how organizations may process in order to accomplish a durable and sustainable unlearning process. This paper investigates how organizations can really unlearn, and proposes a rivaling cognitive enactment process that may contribute to this achievement.

We investigate unlearning in a context of change. Previous research showed the interest of studying dynamic knowledge transformation at times of abrupt change or inextricable crises (Baumard, 1999). Our first assumption is that change theories should not drop off the cognitive aspects of organizational life (after Meyer, 1982). Change and learning theories should be included in an integrative framework in order to draw a comprehensive image of processes at work in changing organizations (Schein, 1993; Hendry, 1996; Fiol and Lyles, 1985). Our second assumption is that dichotomous approaches might fail to notice important implications at the frontier of the two phenomena. Lorsch (1986) for instance sustained that neglecting culture, a learned group phenomenon, may cause serious impediments in strategic change. Presently held beliefs and methods shape perceptions, thus blinding people to potential interpretations of evidence. They also create strong emotional bonds resulting in strong attachment of organizational actors toward them (Hatch, 1993; Kilmann, et al. 1986). Neglected cultural issues lead to resistance to change, which results in half-accomplished, flawed transformations. Certain management scientists grew to conceive organizational changes only through the lens of cultural revolutions (Firsirotu, 1985; Kilmann, 1989).

Alternatively, Weick (1979) suggested that organizations couldn't foster new knowledge unless room is made for new ideas and cognitive frameworks. This new perspective introduced dialectic between old and new knowledge, and old and new learning, as an embedded core process of organizing. Old knowledge is, thus, perceived as an obstacle to renewed cognitive frameworks and new learning, and need to be discontinued before new knowledge can be generated. This process of discarding obsolete knowledge is called unlearning (Hedberg, 1981; Nystrom and Starbuck, 1984; Hedberg, et al. 1976; Markóczy, 1994; Starbuck, 1989).

Organizational knowledge doesn't determine performance; behavior does (Pfeffer and Sutton, 1999). Management research considers the unlearning of old knowledge mainly as a tool for the removal of inefficient behavior in favor of an adaptive one. It is arguable however that unlearning shall be the only option available to reach this goal. Adopting a cognitive perspective, this

paper sets out to demonstrate that unlearning represents only a particular stance of a whole class of processes with similar effects. These processes, brought together under the label of knowledge neutralization, include phenomena such as knowledge invalidation and rivaling enforced enactment. We argue that making old knowledge lose its grip over organizational behavior has been the blind spot in the development of unlearning theories.

The first part of this paper re-examines previous conceptualizations of organizational unlearning, emphasizing the processes and the roles attributed to this phenomenon by management scientists. The second part discusses aspects insufficiently developed or ignored by unlearning theories, such as knowledge validity and activation. This review allows a broader conceptualization of the unlearning issue under the name of knowledge neutralization. The three types of processes identified thereof are then attentively examined and illustrated in the third part of the article. A final section discusses these findings with respect of turning unlearning as a durable and sustainable routine in organizations.

2 Unlearning Theories in the Wake of Organizational Learning: Roles and Processes

For certain scientists, Organizational Learning (OL) is equivalent to a good adaptation of the organization to its environment through simple processes of habit formation. Subsequently, learning would merely be the retention of successful response patterns for reactive use. Recent developments considered a broader range of phenomena: organizations engage in such actions as exploration and experimentation (Nicolini and Meznar, 1995). They thus develop insights, enact their environments and subsequently memorize the causal relationships they had discovered (Hedberg, 1981; Weick, 1999). Organizations make an offensive use of this knowledge in order to achieve a better fit with their environments, and an enhancement of their effectiveness. Learning becomes "the process of developing a potential to improve actions (behavior) through better knowledge and understanding (cognition)" (Villinger, 1996).

Organizational knowledge represents the focal point of organizational learning. It develops from different experimental settings provided by the environment. However, knowledge grows and it simultaneously becomes obsolete as reality changes. Therefore, understanding involves both new learning and eliminating misleading and obsolete knowledge. The discarding activity has been called organizational unlearning (Hedberg, 1981).

One of the first researchers to address the unlearning phenomenon is William Starbuck (1989). According to this author's model of organizational crisis, firms do not only build knowledge by interaction with their environments. They also build trust in their old practices, beliefs, values and frames of reference. However, the repeated success of their application

eventually blinds the organizational actors. They will no longer heed signals that are inconsistent with their old knowledge. When the organization's environment changes, disquieting information such as funds shortages, falling revenues, and actual losses, is accounted for as random deviations. The market must be adapting to a new entrant, the decline of applications must be due to accidental fluctuations, and prices will take some time to readjust because the currency was shaken. The firms enter a first phase of "weathering-the-storm": money is raised through budget trimming and the shedding of peripheral activities; controls are centralized.

At length, however, all slack resources are consumed and the company enters an "unlearning phase" while the incipient crisis turns into a full-blown one. The leaders issue inconsistent messages. People feel disoriented and low morale spreads throughout the firm. Managers who have long time reported that the hard times were ending, loose their credibility. In the end, the worldview and the standard operating procedures break down. The organization has unlearned its past and is now either heading to its end or is busily relearning (Starbuck, 1989).

According to the model of organizational crisis proposed by Starbuck, unlearning is an abrupt process that will precede new learning. Declining organizations don't have the time to change at their own pace: they must change and they must do so quickly. It is suggested that the quickest way to unlearn is to fire the top managers. Two aims are thus attained. First, managers represent a strategic part of the organizational "hardware" in which knowledge is recorded and they can translate this knowledge into action. Eliminating management thus means to eliminate important, active, parts of the organizational memory. Second, employees tend to associate ideas with their promoters, i.e., their managers. Their departure is thus charged with a symbolic value. It will implicitly signify the end of the validity of old values and beliefs and the necessity of seeking new ones. Either way, this viewpoint supposes, first, the deletion of old knowledge (unlearning), and second, the search for, and an experimentation with, new knowledge, which will come to replace the old. Unlearning is a distinctive part of the learning process: unlearning and relearning proceed sequentially. Unlearning also triggers the relearning process.

Besides eradicating complete physical parts of the organizational memory, scientists have also suggested an unlearning modality that supposes the cognitive elimination of knowledge from the organizational memory. Hedberg (1981), discussing the two-level model of organizational learning originally proposed by Argyris and Schön (1976), concludes that "knowledge that has resulted from complete learning cycles in organizations can normally be unlearned through complete cycles too." In other words, knowledge that has been learned through trial-and-error processes, can be rejected through the same trial-and-error cycles. Changing environments induce the unlearning of past knowledge that will consequently eliminate obsolete organizational behaviors. The unlearning process triggers the relearning

process that, through experimentation, imitation, or political dynamics will lead to the creation of new, suitable knowledge for the present environment. The outcome of the relearning process will be the appropriation of new adaptive organizational behaviors (Starbuck, 1989; Hedberg, et al. 1976).

3 Unlearning: A Controversial Process

Considering unlearning as a distinctive part of the learning process has sometimes been deemed artificial (Nicolini and Meznar, 1995). Learning and unlearning, when their distinction is meaningful, often flow concomitantly and not sequentially. Furthermore, this perspective leads to considering knowledge as a stock that can be mobilized or retrieved upon urgent needs, discarded at one's will. As Starbuck and Laudon (1996) pointed out, people in organizations preserve knowledge by applying it, and renew knowledge the very same way. Thus, applying is both of source of preservation and elimination. How then can people know that they are learning a new trick or discarding an old one? While unlearning theories are appealing because they trigger a natural desire to question one's own knowledge, they become impractical when faced with reality.

Moreover, unlearning isn't always necessary (Klein, 1989; Kuwada, 1998). This means that old and new knowledge may coexist in organizational action and memory. Knowledge such as myths, theories of action, values, beliefs, and methods, represents for the organization what cognitive structures represent for the individual. It filters the environmental information and models organizational behavior (Hedberg, 1981; Sproull, 1981; Lorsch, 1986; Pfeffer, 1981; Starbuck, 2000). While they might be obsolete, these chunks of knowledge contribute to the consistency of action, even if detrimental to its performance. Hence, if such "old knowledge" shall be discarded, then most organizations would lose their consistency, maybe able to learn more, but incapable to act. Organizations would either be paralyzed, or would suffer schizophrenia.

Holding that knowledge determines behavior and that old and new organizational knowledge may coexist sounds paradoxical. However, this paradox can be solved if we bring into discussion the phenomena of knowledge activation and knowledge validity. It will be subsequently argued that old and new knowledge can coexist in organizational memory. However, it is only the one that is both activated and has perceived validity that will eventually influence organizational behavior.

3.1 Knowledge Validity

The first two meanings given by American English dictionaries to the word "valid" are: (1) sound; just; well-founded, and (2) producing the desired result; effective: a valid remedy. In the first place, the validity of a piece of knowledge

is related to its ontological value: is it true or false? From this point of view, validity is normally established by the objective conditions an organization's environment may provide. For instance, the laws of demand in competitive markets state that the decrease of the price of goods will surely augment the amount of consumers' demand for them. This law is generally accepted because economists see it to be true and people may notice and experience it in everyday life.

Unfortunately, things are not always so easily accessible or visible. This usually leads organizational actors away from the realm of objective validity toward perceived validity. This dichotomy is necessary. As Baumard and Starbuck (2005) point out, cognition does not afford a dependable basis for learning. Most managers have very erroneous perceptions of both their firms and their business environments (Mezias and Starbuck, 2003). Top managers, for instance, are often rather out of touch with current customers, suppliers, or technologies.

The same discordance between objective and perceived validity may turn the other way around. Management fads, for instance, usually spread this way. The Singer Company embarked on a certain product diversification strategy from 1967 to 1974. Managers noticed that this strategy was successful for other companies (Miller and Friesen 1980). Heavy losses determined by its continuous pursuit didn't manage to shatter the perceived validity of this causal association. Hedberg (1981) called this phenomenon superstitious learning: organizational actors attribute (perceived) validity to a piece of knowledge that is objectively invalid. Such learning usually occurs under conditions of ambiguity, or when the complex interactions between organizations and their environments exceed people's cognitive capacities for mapping, so that faulty inferences are drawn. The clear-cut distinction between perceived and objective validity is very important since it is perceived valid knowledge that shapes and affects organizational behavior outcomes, while objectively valid knowledge, as well as perceived invalid knowledge, may stay unheeded by organizational actors.

All organizational actors try to establish the perceived validity of knowledge against objective data (Daft and Weick, 1984). A part of the organizational knowledge could be validated this way. Unfortunately, however, because a large part of organizational knowledge is socially constructed, the yardstick of objective validity doesn't always exist (Baumard, 1996). In such cases, validity will be defined by its second meaning, that of producing effective outcomes.

3.2 Validation, Invalidation, and Strategies for Unlearning

The various strategies for organizational unlearning proposed by previous research are suffused with assumptions concerning the ontology of knowledge. They fall mainly in two categories. The first group (a) focuses on procedures, practices, exchange protocols with the task-environment of the firm, as well

with certain behavior-outcome associations, rules, norms, and structures. The second group (b) focuses on goal-setting, cultural beliefs and obsolete causal patterns carried over by the overall organization.

Most of these theories see "first-order knowledge" as a main source of learning inertia, whether this inertia comes from frozen behavioral routines or organization-wide obsolete belief structures. However, Klein (1989) argued that first-order knowledge mustn't necessarily be unlearned. Its validity can be easily checked because its outcomes are immediate and can be interpreted readily. Once it is proved that first-order knowledge is no longer appropriate, it will be 'bracketed' or marked by invalidity. Therefore, obsolete knowledge may last in the organizational memory without being deleted and without being subsequently enacted.

Second order knowledge can be understood according to notions such as frames of reference (McCall, 1977), myths and perceptual filters (Hedberg, 1981), theories of action (Argyris and Schön, 1976), and basic assumptions (Kuwada, 1998). This knowledge plays a major part in organizational life. First, it allows the interpretation of complex environmental and internal configurations due to meta-rules of perception and event expectancies. Thus, it frames the organizational actors' input information, usually without their awareness (Lorsch, 1986). Second, these logics of action will shape decisions and strategies, often in an unconscious manner. The reverse of these is the high complexity of such knowledge (Starbuck, 1983). In addition, the extremely loose coupling between this knowledge and organizational outcomes makes the mechanisms for its validation practically nonexistent. Consequently, second-order knowledge will seldom change, except under extreme circumstances. For instance, myths will change only by conquest or by ideological contamination (Hedberg, 1981).

Kuwada (1998) studied the process of strategic learning at the corporate level, namely the dynamics of basic assumptions. Basic assumptions serve as devices for sense-making, they determine modes of interpretation, and they underlie interpretation routines. They also condition and shape the design process of corporate-level strategic behavior. Strategic learning could not follow a trial-error process. Basic assumptions are a tacit form of second-order knowledge, usually entangling strongly held, emotionally loaded beliefs. They describe complex realities that can be hardly invalidated. When new assumptions come into competition with old ones, strategic behaviors will be determined alternatively by the old and new assumptions. Thus, they will concomitantly be held in organizational memory, and will be alternatively used until, in the end, the one will be fully validated and the other will eventually fade from organizational memory.

The two preceding examples show that erasing obsolete knowledge is not the only way that allows new organizational knowledge and behavior to develop. Old knowledge may coexist with new knowledge without interference as long as the former is considered invalid. They seldom can both be considered valid, however—a temporary situation which is always accompanied by political conflicts in the organization (Hedberg, 1981). Unlearning and relearning can then hardly be disentangled in such a case.

Table 1. Objects of organizational unlearning in several studies

Unlearning Studies	Source of Knowledge Inertia	Unlearning Process	Outcomes
Hedberg, 1981 (b)	Values, frames of reference, theories of action, myths	Undoing the full myth cycle Undoing superstitious learning with new myths	Antithetical organizational myths renewal
Nystrom and Starbuck, 1984 (b)	Organizational ideologies and beliefs	Organizational crisis, laying off top managers, symbolic actions	New ideologies and symbols will need further abrupt discarding
Schein, 1993 (b)	Behavioral rituals, practices, cultural assumptions	Cultural "green room": challenging culture and rituals	Developing a continuous behavioral learning culture
McGill and Slocum, 1993 (a)	Old managerial practices, ideas and beliefs	Type II-Learning	Continuous learning through routine revision
Markóczy, 1994 (b)	Operational routines (related to production and exchanges with the organization's task-environment)	Undoing cultural and paradigmatic routines (accepted and institutionalized classifications, interpretations and rules)	Sustainable institutional mechanism: renewed institutionalization
Starbuck, 1996 (b)	Overconfidence in obsolete technologies	Encouraging skepticism Indirect actions	Developing a skeptic culture that questions over-rated trust in old knowledge
Argote, 1996 (a)	Technology, structure, documents and procedures	Individual and organizational forgetting	Discarding routines
Carmona and Grönlund, 1998 (a)	Successful routines and practices acting like a frame of reference that maintains stability and status quo	Cross-Functionality Cross-Cultural Confrontation New combinations of old knowledge	Formalization of unlearned routines
Kuwada, 1998 (a)	Silos from multi-divisional organization Corporate cognitive prejudices	Ecological model: new breeds of managers bring new seeds for unlearning	Top management team continuous renewal

3.3 Matters of Knowledge Activation

Up to this point, it was implicitly assumed that the perceived validity of knowledge would also guarantee its translation into action. It has been shown that individuals, however, do not obey such a law. Argyris' work (1993) suggests that human beings have in their heads more that one design about how to act effectively. Faced with difficult, threatening, or embarrassing issues, individuals' behavior suggests an underlying pattern of cognitions that are labeled "theories-in-use." Nevertheless, when questioned about their reasons, the same individuals would describe rationales that are inconsistent with their former actions. These beliefs, of undoubted sincerity, are labeled "espoused theories" (Argyris, 1993). Two conclusions are in order. First, though individuals are unaware of their influence, theories-in-use are valid because they are enacted, according to the second meaning of validity. Second, espoused theories also enjoy a perceived validity since people sincerely believe they represent the truth. The two theories are both valid and they deal with the same issues. Yet, only one of them is effectively put into practice.

A similar phenomenon was noticed in organizations. Though firms accumulate important amounts of intellectual capital, a big part of it is never translated into action (Want, 1993). Noticing this knowing-doing gap, Lew Platt, CEO of Hewlett Packard, has justifiably exclaimed: "I wish we knew what we know at HP!" (Pfeffer and Sutton, 1999).

Pfeffer and Sutton (1999) advanced an explanation that seems reasonable for both individual and organizational cases. The existence of valid knowledge that is not put into practice is explained by the carelessness of firms and individuals concerning tacit knowledge. Organizational knowledge should, in these authors' opinion, be primarily configured in this uncoded, applied form through a process of internalization before it becomes ready to use or active. We will broaden their argument by suggesting that valid knowledge is only activated inside special knowledge repertoires. Only there can it be in a position to influence the organization's strategic behavior.

The existence of such registers flows naturally from the polymorphism of organizational knowledge (Girod, 1995). For instance, Nonaka (1994) highlights the difference between explicit and tacit knowledge. Baumard (1996) differentiates knowledge as individual and collective knowledge according to the number of individuals that share it. The intersection of the two dimensions determines four types of knowledge registers: explicit individual, tacit individual, explicit collective and tacit collective. All the four types of knowledge are present in any organization. Baumard also demonstrated that, faced with ambiguity, organizations react by transferring knowledge from one register to another. In this way, organizations obtain a better mapping of their dynamic environment. They also fan out such knowledge that is fitted to determine appropriate actions for the succeeding phases of ambiguous situations. Kuwada (1998) defines organizational knowledge along another dimension, somewhat similar to the hierarchical

position of the loci of knowledge. He thus identifies business-level knowledge, mainly present at the business-unit level and characteristic of middle-management. A more important type of knowledge is that of corporate-level knowledge, that infuses all the organization and activities performed. Kuwada also specifies that it is not until knowledge evolves from business-level to the corporate-level register that it will influence the design process of strategic behavior.

This research allows two important conclusions. First, an organization's knowledge base is heterogeneous. It is made up of different registers where knowledge has particular properties and roles. For instance, tacit knowledge is uncoded but readily usable, while business-level knowledge is grounded, related to very specific business contingencies, but couldn't govern the corporate policies. Second, knowledge flows from one register to another. A piece of knowledge is active only inside the specific register that governs the corresponding organizational behavior (Kim, 1998). Therefore, the transfer of knowledge from one register to another has either an activating or a deactivating character.

4 Unlearning and Knowledge Neutralization

Is the organizational unlearning matter artificially developed? Researchers often agree that persons act and learn within the organizational framework and that organizational learning is a result of individual learning (Nicolini and Meznar, 1995; Hedberg, 1981). Or individual unlearning is not as much a matter of discarding knowledge, as it is a matter of reduced response availability. The success of such methods as hypnosis or cortical stimulation, as well as the "spontaneous recovery" of unlearned items, show that nonreproduced items are not necessarily lost for ever (Klein, 1989). On the other hand, organizations can unlearn by eliminating the "hardware" that stores the organizational memory, by firing key personnel, "refreshing" their archives, or by simply loosing their blueprints (Weick, 1999).

Miller (1978) signaled that in most debates, diametrically opposed adversaries may be each correct—but in different contexts. Actually, unlearning theories have mostly been developed for organizations facing crisis when time is short because survival is at stake. Quick invalidation is difficult, especially for second-order knowledge. Hence, more radical measures as the exclusion of organizational knowledge—unlearning—are justified. On the other hand, organizations that are not faced with dangerous environmental deadlines may forsake the unlearning/relearning cycle for a piecemeal incremental learning approach. Hence, people in organizations might well be aware of the obsolete nature of part of their knowledge, and strategically chose to put it aside, either for political motives, or as to avoid liability in a potential failure (Baumard and Starbuck, 2005). Prior knowledge cannot influence organizational behavior once it is excluded from organizational memory. As

Baumard and Starbuck (2005) observed in their fourteen case studies of small and large organizational failures, unlearning is often prevented by erasing or rewriting history, moving people around, or re-qualifying painful experiences as healthy and most needed experimentations.

Hence, people and organizations alike fail to unlearn, because they have put aside the repository of knowledge that contains the ground for unlearning. While accepting the existence of these knowledge repositories, unlearning could still be achieved by two other ways—either through rivaling enactment or through knowledge inactivation. This is what we label as "knowledge neutralization." Neutralization refers to purposefully destroying a peculiar or opposite disposition inherited or embedded in a knowledge body. For example, core beliefs of an organization create a "feeling of knowing" and encourage the pursuit of the application of obsolete knowledge. Neutralization is the process by which managers may counteract the effect of these core beliefs and obsolete knowledge on their decision making.

Learning mechanisms emerged in historical contexts, and bear with them the prejudices, jurisdictions and founding flaws of their first design. For instance, in large disasters, many jurisdictions and organizational bodies have to reconcile years of separate learning into one consistent and coordinated ephemeral organization. Many discrepancies in large-scale emergencies come from the "archeology of learning" of the different organizations cooperating. Different layers of learning habits become heterogeneous sediments in each organization. They impede new learning by preventing new knowledge to settle or being considered. We thus define "archeology of learning" as the accumulation at length of layers of learning experiences, habits and systems that produce the current learning system or mechanism of an organization. In their study of the NASA Challenger shuttle disaster, Starbuck & Milliken (1988) point out the critical role of "perceptual filtering" in the event of unseen disasters. In time, organizations tend to reinforce their core beliefs, by discarding small failures as just a reinforcement of commitment to their beliefs, and large failures as external and historical exceptions (Baumard and Starbuck, 2005). Reward systems and incentives in organizations indeed favor parochialism, as people are rewarded for improving knowledge in their field, in respect of their attributed jurisdiction. Individualistic modern cultures, in both Europe and the U.S., also favor the expertise of the few, over the value of knowledge sharing. As a result, most organizations, public and private, encourage by design the creation of "learning silos" within their walls.

A major consequence of these "learning silos" resides in the tunnel visions that jurisdictional entities develop over time. In times of normal operating conditions, adjustments between the different bodies in charge of a systemic environment are accomplished through "fine tuning." Exceptions are tolerated, and for example, a passage made through a levee for train railroad will be accommodated, as we saw in the 2005 hurricane Katrina disaster in New Orleans, as far as it does not challenge the core beliefs of the respective concerned groups. Over time, all these small "adjustments," "corner cuts,"

create spaces where learning do not have any ownership. While a cut in the core belief has been accepted, the concerned zones become a "no challenge" zone for the respective learning systems. When large-scale disasters arise, the history of the "corner cuts" is lost. Fine-tuning that might create a serious threat to critical infrastructure has escaped both the learning systems and the memory of current actors. The "structural holes" in infrastructure learning are both the results of the sediments of old obsolete learning systems and on-going fine-tuning that create "no care" zones in jurisdictional systems.

Hence, organizations are struggling with an evolutionary neutralization of their knowledge base, while being over-influenced by core beliefs, and mostly incapable of purposefully choosing which knowledge should be neutralized, and which should be put forward. For instance, in the Katrina's disaster response, the Army Corps of Engineers, in charge of levees maintenance, had little influence over urbanization that is outside of their legitimate jurisdiction. When levees are erected they require a sufficiently empty ground around them for further elevation. The City of New Orleans overlooked this requisite, and encouraged homeowners to build near to these levees. While levees and flood control are outside of the City's jurisdiction, expertise and learning curves on this specific matter have been naturally neutralized over time. As this example shows, neutralization of previous learning can be either desired or overlooked.

Several types of knowledge are at play in this interaction between neutralized learning over time and the upcoming of new knowledge. The subsequent section will provide details concerning the processes at work for each identified type of knowledge neutralization. Attention will be paid also to the circumstances when they apply most and to the management literature that illustrates them.

4.1 Knowledge Neutralization Through Rivaling Enforced Enactment

The invalidation of second-order knowledge is usually considered to be a difficult undertaking. First, this knowledge is often invisible to organizational actors. Few individuals are aware of their beliefs, values or assumptions (Lorsch, 1986). Second, it is very loosely coupled to organizational performance. On the one hand, second-order knowledge doesn't wholly determine organizational actions. It rather shapes them in interaction with other types of knowledge. For instance, decision-makers ponder environmental information, norms, outside opinions, and their own beliefs and values before enacting a specific course of action. On the other hand, performance may be time lagged. It can also correspond to the composed result of cumulated, distinctive organizational actions (Spender, 1996). Thus, a specific piece of second-order knowledge becomes very loosely coupled to performance indicators (Glassman, 1973). Trial-error invalidation cannot function. Negative outcomes will be merely accounted for as accidental, historical or temporary phenomena (Baumard and Starbuck, 2005).

For instance, in the response to large scale disasters, the different involved organizations act upon their own peculiar second-order knowledge. The Army Corps of Engineers will work on preventing water to overflow the levees, for it is their core belief that the magnitude of flood levels has been identified in the past, and is within a predictable range. City planners on the other hand, act upon their own secondary knowledge and will answer to urban growth by eliminating the marsh that surrounds New Orleans. It has been forgotten, however, that these marshes have been taken into account in calculating the level of levees by the French engineers who created the water barrier around "la Nouvelle Orleans" two centuries earlier. The Army Corps is evaluated on the maintenance of the current levees, not on challenging the systemic organization of the whole region. Meanwhile, City Planners are evaluated by their good handling of rapid growth, not on making sure that the city is surrounded by levees. Both organizations act on their own rights, and both are legitimate in doing so. As they test their beliefs against their own jurisdictional experimental grounds, these beliefs always come back validated. Hence, even trials and errors are likely to reaffirm the core beliefs (Baumard & Starbuck, 2005).

When trial-error mechanisms are futile, knowledge may be invalidated according to a principle of frequency. Postman and Underwood's (1973) study of the dynamics of association supports this view at the individual level. In their research, individuals were first conditioned to expect that an event B would follow an event A. Experimenters subsequently substituted event B with event C. The repeated occurrence of the A → C association began at some point to replace the old association A → B. The latter was gradually transferred to a less accessible area of the individuals' memories. Humans' associative memories are thus updated through dynamic reallocations based on the frequencies of the observed relationships.

Repetition also influences the validity of knowledge at the organizational level. Top managers often hold different world-views, act according to different paradigms, and want to guide corporate strategic actions following their personal beliefs. Managerial beliefs surfacing at the organizational level usually turn into basic assumptions. Kuwada (1998) argues that the selection mechanism of these assumptions depends on environmental support and repetition. Unused basic assumptions loose perceived validity. The process also works the other way round: the lessening of perceived validity decreases the use of respective basic assumptions. A vicious circle sets in: lesser use, lesser perceived validity, and lesser use. These considerations lead to a first, frequency-based, principle of neutralization. The more frequent the enactment of new, rivaling knowledge, the lesser the perceived validity of old knowledge, and vice versa. In time, old knowledge generates less behavioral outcomes than new knowledge.

Neutralization through rivaling enforced enactment evolves through long periods of time. No direct actions can be undertaken to suddenly shatter deeply embedded beliefs or worldviews held by numerous organizational actors. Nevertheless, neutralization can be accomplished by initiating the

circle of invalidation through domination. One way to start this dynamics is by doubting that the beliefs, values, knowledge, information, abilities, and skills that are held are necessarily true or valid. As Weick (1999) pointed out, the opposite of crediting is doubt, rather than disbelief. Therefore, doubt is likely to slightly reduce the perceived validity of organizational knowledge, thus putting in motion the neutralization circle.

One way to insert doubt in organizational life is by altering the organizational culture in order to accommodate Starbuck's (1996) following eight viewpoints:

1. "It isn't good enough"—dissatisfaction is probably the prevalent reason for doubting current knowledge;
2. "It's only an experiment"—make people feel like experimenters, they will probably alter their beliefs and methods and look for new insights;
3. "Surprises should be question marks"—both pleasant and unpleasant surprises may engender doubt;
4. "All dissents and warnings have some validity"—if there is dissent, it might be well founded; therefore managers should not overlook it;
5. "Collaborators who disagree are both right"—qualified observers always have foundations in some sort of truth, even if they disagree;
6. "What does a stranger think strange?"—insiders need outside opinions in correction to their own. Outsiders may provide startling insights that cannot be generated inside of the organizational setting;
7. "All causal arrows have two heads"—organizational actors are invited to dialectical reasoning in order to challenge their own tacit assumptions;
8. "The converse of every proposition is equally valid"—dialectical reasoning should not be confined only to causal insights, but to all kind of organizational knowledge.

Lorsch (1986) proposed an alternative method that could be used in order to impel the change of basic beliefs in organizations. The main argument is that invisible beliefs are difficult to fight, especially when they generate strong emotional commitment. An audit is recommended that should identify beliefs shared by top managers. The results ought to be made visible, explained, hung on the walls. If managers become aware of their beliefs, they are less likely to be blinded by them and are apt to understand and to deal more rapidly in the face of change, retaining beliefs that are reasonably valid and gradually dropping out those that are not.

The two previous examples show that knowledge neutralization through rivaling enactment is fundamentally related to cultural dynamics. Organizational culture should be modified or made visible in order to foster doubt and to set in action the creation and enactment of new knowledge. Such process is inevitably time consuming. Furthermore, in order to influence knowledge neutralization, one should be able to alter an organization's culture. Therefore, the actors that are more likely to trigger this process are charismatic leaders or external auditors. Large, integrated, planned,

organizational changes are the only instances of purposive organizational change where knowledge neutralization through rivaling enactment could be intently triggered and performed.

4.2 Knowledge Neutralization Through Knowledge Inactivation

Whenever managers don't have the means or time to influence the perceived validity of organizational knowledge, they should try to neutralize it by an inactivation process. According to our previous argument, knowledge can influence organizational behavior only once it has been configured inside specific knowledge registers. Whereas Pfeffer and Sutton (1999) discussed the process of knowledge activation, it can be conjectured that valid knowledge may also be inactivated, provided that one can force it to move to an unfavorable register (Spender and Baumard, 1995). Therefore, knowledge inactivation may be defined as neutralization based on inter-register knowledge dynamics. Once transferred into an unfavorable register, organizational knowledge is unable to influence ancient target-behaviors and becomes inactivated.

Although this issue has not been discussed yet under these terms, the literature provides case studies that could be interpreted as knowledge inactivation. The research performed by Carmona and Grönlund (1998) on two car manufacturer subsidiaries is such an example. The main purpose of the study was to develop insights about the learning and forgetting processes according to an experience curve paradigm (Argote, 1996). Hereby we suggest that the process called forgetfulness by the two authors may be interpreted as an instance of knowledge inactivation.

The event under study was the setup of task forces at the shop-floor level (Carmona and Grönlund 1998). Their main objective was to fluidize the production flows constrained by several bottleneck areas, to increase capacity and production compliance, and to improve quality and working conditions. Teams were formed by a diversified range of employees such as operators and middle managers—an industrial engineer, maintenance engineer, manufacturing engineer, maintenance foreman, and front line supervisor.

During a first phase, the trajectories followed by the working teams of the two firms were quite similar. Members drew lists of problems. They also gathered information that was fully independent from the one provided by the central budgeting systems. Items were discussed in order to ameliorate product quality, production schedule compliance, and the consumption of maintenance services. Solutions were proposed and implemented. The researchers interpreted the subsequent overall increase of production outcome as a proof of organizational learning.

The second phase brought a differentiation between the trajectories of the two task forces. The Swedish factory acknowledged the performances of their working team and decided to offer support by providing it with formal status

and by rewarding the efforts of the participants according to a comprehensive reward system. The production level obtained was thus further maintained and continued to progress slowly. In the Spanish subsidiary the situation was largely different. The lack of formal status was cruelly experienced when the task force had to deal with problems outside of its area of influence. The efforts of team members were also poorly rewarded. At length, individuals returned to their previous practices, disappointed with the manufacturer's inattention to their efforts. Production levels fell rapidly to the levels existing before the setup of the informal team.

Carmona and Grönlund (1998) interpret the phenomena, respectively, as knowledge maintenance and as a process of forgetting. They argued that the inclusion of the informal Swedish team in the organization chart acted as a shield against the dissipation of new knowledge created by the working teams. The absence of such a shield led to the loss of this knowledge in the Spanish plant.

The evolution of the two cases may remind one of the definition of communities of practice: "Within communities-of-practice, people share tacit knowledge and through dialogue bring this to the surface; they exchange ideas about work practice and experiment with new methods and ideas; they engage in discussions which affirm or modify theories in use; they innovate new problem-solving routines and simultaneously manage and repair the social context" (Hendry, 1996). Though one might argue that the working teams never became communities-of-practice since they reunited people with very different expertise (Wenger and Snyder, 2000), their trajectories and modus operandi demonstrate that they did engage in the creation of tacit, collective knowledge that bolstered production levels. Such knowledge only exists and acts as long as it is supported by a special social context based on frequent interaction and exchanges among individuals. While such social structures were sustained and confirmed in the Swedish plant, they were submitted to a rapid process of erosion in the Spanish one. Though in the latter case the structures fell apart and performance was lost due to knowledge inactivation, it is reasonable to suppose that reinstating those structures after a short while would have reactivated knowledge that Carmona and Grönlund (1998) considered lost or forgotten. Thus, one may suppose that knowledge did not disappear, nor was it forgotten, but it passed in a first phase from the tacit, collective register to the tacit individual one, where it became inactive in the absence of interaction.

Purposive knowledge inactivation may prove to be a difficult endeavor. First, managers should identify detrimental knowledge and the registers where it is configured (e.g., tacit, collective knowledge). Second, they will have to figure out the registers where this knowledge may be inactivated (e.g., explicit, individual knowledge). Third, managers should find a way to transfer this knowledge from one register to another. Few scientists suggested controls for such knowledge dynamics, save for Osterloh and Frey's (2000) finding that motivational levers might influence knowledge transfers. However, once these

elements are uncovered, knowledge inactivation may be attained in medium term organizational changes.

4.3 Neutralizing Knowledge Through Unlearning

Although the last in the order of our discussion, this type of knowledge neutralization seems at the same time the easiest, the fastest, and the most common. It is performed either through the physical or the cognitive expulsion of knowledge from the organizational memory (Starbuck, 1989; Hedberg, et al. 1976; Nystrom and Starbuck, 1984; McGill and Slocum, 1993).

Knowledge management has always been fascinated with the metaphor of thinking machines, an image that usually has a limited utility (Starbuck, 2000). Nevertheless, this metaphor can be used in this case because organizational knowledge, just like computer stored and treated information, cannot exist in the absence of a storage device. Such a role is performed in computers by ROM and RAM memories: hard disks, floppies, CDs and the like, while organizational knowledge is stored in the organization's technology, its structure, documents, standard operating procedures, and most especially its members (Argote, 1996). Knowledge can depreciate if any of these elements are lost or affected: individuals who leave the organization, technologies that become inaccessible or difficult to use, organizational records and routines that are lost or become difficult to access. A manager that identifies the undesirable knowledge can simply get rid of it by expelling its support. Therefore, knowledge neutralization through unlearning is based on a principle of exclusion. It is the fastest alternative for neutralization, as organizations eliminate undesired behaviors by discarding the underlying, obsolete knowledge.

A very important part of organizational knowledge is shared by the organizational members. Driving away obsolete knowledge by eliminating its support becomes unrealistic. Managers can rarely afford to fire all the people that share it without hindering the good functioning of organizations. It has been noticed, though, that interesting effects are at work while firing the promoters of such shared knowledge. The dismissal of top-management teams, for instance, besides the elimination of individual knowledge and experience, also has a symbolic dimension. People tend to associate the latter's departure with the invalidity of the old methods, beliefs, and strategies, of which they were fierce promoters (Starbuck, 1989; Hedberg, et al. 1976). Such an event will thus accomplish two tasks: first the elimination of top-managers' knowledge, and second the invalidation of shared second-order knowledge such as beliefs, methods, and strategies that they have been supporting or promoting.

As argued above, such knowledge is not unambiguously related to performance indicators and might be invested with political stakes. In their study of a large divisional telecom firm, Baumard and Starbuck (2005) showed that firms learn sometimes surprisingly little from failures: "managers find

it easy to explain both large and small failures as having idiosyncratic or exogenous causes that no one could have foreseen, and to rationalize their personal actions in terms of their firm's core beliefs [. . .] The learning that should follow failure often does not occur, and when it does occur, it often teaches the wrong lesson." (p. 295). Nevertheless, cognitive expulsion can be performed on first-order knowledge, such as programs or standard operating procedures that are tightly coupled with an immediate outcome. For instance, a manager can neutralize undesired practices by explicitly and formally banishing them through the scripts assigned to the respective organizational roles. This method is largely present for instance on high reliability organizations such as nuclear aircraft carriers or nuclear plants, where destructive mal-practices are explicitly forbidden. Though such a method is readily available, specialists may have to spend a lot of time until they are able to identify negative first-order knowledge! (Starbuck, 1996). For instance, people in organizations tend to confuse first and second order knowledge. What are merely behavioral habits (first order) are often taken for granted as rightful models and paradigms. Conversely, unnoticed, unacknowledged beliefs and ideologies (second order) generate automatic behavioral responses that people tend to see as rational actions (e.g., rational myths).

5 Discussion and Conclusion

To this day, organizational literature has attributed two main roles to the unlearning process. On the one hand, unlearning was considered an unavoidable precedent for effective organizational learning (Starbuck, 1989; Nystrom and Starbuck, 1984; Hedberg, et al. 1976). Even if such a priori didn't gather widespread recognition, it is generally acknowledged that discarding obsolete knowledge makes way for new knowledge, thus fostering the relearning process. On the other hand, unlearning was considered a trigger for new learning (Hedberg, 1981). The removal of knowledge would signal change to disoriented organizational actors. Unfortunately, such triggering couldn't be controlled. According to this paradigm, unlearning is mainly induced by major adverse environmental shifts.

   This article generalizes organizational unlearning toward the notion of knowledge neutralization. Unlike the former concept, knowledge neutralization cannot pretend to have an inevitable role in organizational learning. It merely represents a group of phenomena that results in the disappearance of obsolete behavior through knowledge manipulation. Nevertheless, it can be used as a powerful support tool in organizational change. One of its main roles is to help organizations get rid of detrimental behavior. Although precedence is no longer an issue, the unavailability of past behavior makes it possible for employees to embark on a quest for new knowledge and to experiment, thus fostering new learning.

It has been argued that knowledge neutralization is a controllable process. Unlike the classical point of view on unlearning, agents of change may trigger particular instances of knowledge neutralization, according to the resources and time available. For instance, organizational designers could embed Starbuck's (1996) eight viewpoints in a new, flexible, competitive organization. If shared obsolete knowledge results in reiterating bad results or dissent, managers could try to identify its locus and inactivate it through a transfer to an unfavorable knowledge register. Finally, time shortages may justify a manager's actions directed to organizational unlearning. Eliminating knowledge this way may be painful, but it is sometimes a better alternative than slow erosion and eventual bankruptcy.

In conclusion, managers should use knowledge neutralization techniques selectively, according to organizational and environmental contingencies in terms of resources and type of targeted knowledge. By eliminating obsolete behavior, knowledge neutralization becomes an adaptive tool for facilitating and accelerating organizational change.

Recent developments in organizational science outline the importance of knowledge creation. Many scientists are concerned with learning organizations: fewer refer to unlearning organizations. Obviously, the gathering and activation of knowledge are no trivial actions. They are consuming of time, resources, and attention. Hopefully, obsolete knowledge or behavior will, at length, fade away and make way for new knowledge or behaviors. But in a world where resources and time for change are short, such lingering is likely to promote ideologies rather than produce real unlearning. Organizations may be likely to unlearn, if they start by unlearning the way they currently unlearn.

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Managing Knowledge for Innovation:
Production, Process and Practice

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Abstract: This chapter aims to provide a review and critique of shifts in dominant ways of thinking about the relationship between knowledge management and innovation, both in terms of the assumptions they make about knowledge (and knowledge management) and the assumptions they make about innovation processes. Thus, three broad perspectives, referred to here as "production," "process," and "practice" perspectives are contrasted. These perspectives are outlined briefly below and illustrated, in the chapter, by drawing from examples from our IKON (Innovation, Knowledge and Oragnizational Networks) Research Centre. In contrasting these perspectives, I argue, not that one or other is necessarily superior, but rather that each has its own set of assumptions, and limitations, regarding the nature of knowledge and innovation. Viewing the knowledge management through these different lenses makes it possible to rethink the paradoxes and tensions around attempts to manage knowledge in innovation contexts.

1 Introduction

The need for innovation is frequently seen as a key objective for the development of Knowledge Management (KM) theory and practice. Accordingly, a growing amount of research has attempted to articulate the relationship between the management of knowledge and effects on innovation. For example, Nonaka's (1994) now widely cited work emphasized the need for "knowledge creating companies" to manage the conversion of knowledge from one type to another (tacit to explicit). Similarly, more recent literature on "dynamic capabilities" highlights the importance of developing and managing learning mechanisms focused on "experience accumulation," "knowledge codification," and "knowledge articulation" in order to generate and modify operating routines in the pursuit of organizational innovation and improved competitiveness (Zollo and Winter, 2002). Indeed, the links between knowledge and innovation, and the virtue of knowledge management for improving innovation are rarely questioned in the literature, to the extent that knowledge has even been roughly equated with innovation (—hence

comments such as "knowledge management is mostly about innovation" (Hyde and Yi, 1998)).

This chapter provides an overview and critique of shifts in dominant ways of thinking about the relationship between KM and innovation, both in terms of the assumptions they make about knowledge (and, so, knowledge management) and the assumptions they make about innovation processes. The chapter is structured as follows. First a case of innovation—the Cataract projects at East General Hospital—is described. This case study was conducted as part of a larger research project in our Innovation Knowledge and Organizational Networks (IKON) research center. However, here it is presented simply as a "vignette" upon which the different perspectives on KM, outlined in the remainder of the chapter, can be brought to bear, compared and contrasted. The following sections outline three broad perspectives on KM—referred to here as "production," "process," and "practice" perspectives. For each perspective, the assumptions that they make about the nature of knowledge, the nature of innovation and the practical tasks and tools of KM, are laid out. These assumptions are illustrated and explored with reference to the Cataracts Case.

Finally, the chapter concludes with a discussion around the tensions and trade-offs between these different approaches to KM in the context of attempts to innovate. The major argument is, not that one particular perspective is necessarily superior for managing knowledge, but rather that each has its own set of assumptions, limitations and tensions regarding the nature of knowledge and innovation. Viewing KM through these different lenses, therefore, allows us to rethink the paradoxes and tensions around attempts to manage knowledge in contexts, in particular, where innovation is a primary purpose. However, whilst production and process perspectives have been prominent in the KM literature (using, perhaps, other labels), practice-based theorizing and its implications for KM has received relatively less attention. Therefore the chapter devotes particular attention to what might be learned from practice-based thinking on KM.

2 Case Vignette: Cataracts Project at East General Hospital

East General Hospital is one of a large number of regional trusts that together make up the National Health Service (NHS) of the United Kingdom. One of the areas targeted by the UK government as in need of change in the NHS is the cataract diagnosis and treatment procedure. Cataract surgery—a 20-minute procedure—represents 96% of the ophthalmology workload. Traditionally, cataract diagnosis and treatment involved a long series of visits to various specialists, beginning with the optometrist (local commercial optician). Whilst the optometrist has sophisticated equipment and can easily detect cataracts, they are not medical professionals. Therefore,

they would diagnose "suspected" cataracts and refer that patient to his or her General medical Practitioner (GP). The GP, not being an eye specialist would generally rely on the diagnosis of the optometrist and forward the patient to the hospital for a brief consultant appointment. On confirming cataracts, the patient was scheduled for a physical examination with a nurse in order to confirm their suitability for the operation. When all of these visits were complete the patient would be placed in the queue for obtaining a date for the cataract surgery—in many trusts, lead-time being over 12 months. Post-surgery, another visit to the consultant was scheduled and then the patient was finally referred back to the optometrist for spectacles. In all, then, it took patients at least six visits and often well over a year to have a routine, 20-minute, outpatient, surgical procedure and, thus, a new reengineered cataract diagnostic and treatment process was seen as potentially beneficial.

A designated member of the hospital's "transformation team" was assigned to facilitate the change process. The team was unique to this particular hospital, whose remit was to facilitate organizational change, both identifying where change might provide most benefit and encouraging buy-in from relevant groups. The transformation team member identified knowledge sharing as a key priority and used their own personal contacts to gather together a group of eye experts from both the hospital and the community to discuss ways in which to cut surgery lead times and improve patient satisfaction. Members of the cataract team included the head nurse in the eye unit, a hospital administrator, general practitioners, a set of optometrists from the local community, and a surgical consultant who was instrumental in championing the change process. Because the group did not meet on a day to day basis, meetings were held in the evening to facilitate attendance. Minutes, flow charts and other necessary documentation were produced by the transformation team member and distributed after each meeting for comment. At the outset meetings were rather "difficult," with each member defending their own position. But, with repeated meetings, the specialists involved began to share information about their current roles and procedures more openly. Based on a more collective understanding, plus an increased awareness of the competencies and skills of the various groups involved, they were able to begin to see alternatives to the traditional process. In doing this, each individual in the team drew upon his/her own experience and knowledge, but also used their personal networks to find out what was happening in other hospitals.

A number of changes to the existing process were made. Non-essential visits to the general practitioner; the consultant and the nurse were eliminated and, instead, optometrists were empowered to decide if a patient needed cataract surgery. In doing so, they were required to fill out a detailed form—developed by the project team—that provided the consultant with specific information about the nature and severity of the cataract, and to call the hospital and book a time for the patient's surgery. For their additional responsibility, the optometrists were given extra training and received a small

financial incentive. The preliminary pre-operation physical was replaced with a self-diagnostic questionnaire that each patient was required to fill out and return to the hospital before surgery. This questionnaire was again designed by the project team (based on forms used elsewhere). Immediately before surgery, nurses telephoned each patient to check details and answer any questions. Post-operation consultant appointments were also replaced with follow-up telephone calls. The new cataract procedure resulted in a number of efficiency gains. Lead times were radically reduced from over 12 months to six to eight weeks. In addition, theatre utilization rates improved and, most importantly, according to follow-up phone conversations, patient satisfaction improved dramatically.

The new cataract process significantly altered roles and responsibilities, particularly for the optometrists, who could now diagnose and directly refer patients. This process, however, was not entirely straightforward, and significant knowledge sharing was needed, in particular among the consultants and the optometrists so that the optometrists could learn how to make diagnoses that were acceptable to consultants. The consultants also provided optometrists with regular feedback on the patients they had referred and answered their questions. For example, one optometrist explained that at times he had needed to clarify issues with the consultant and claimed that this would be very difficult for consultants who had not been involved in the cataracts project because they did not trust the optometrists to have the required expertise:

While there were many advantages of the new system there were also pockets of resistance. Previously, theatre scheduling had been done by each consultant's secretary but this secretarial support had been centralized, and theatre scheduling allocated to a new administrator. The secretaries resisted, insisting that they were "far too busy" to be assigned to more than one consultant. In order to overcome this problem, one of the nurses on the project team contacted a friend in another hospital that had successfully introduced a centralized secretarial pool and took the secretaries to see it working. While this helped weaken the resistance, it did not eliminate it. For example, initially the administrator in charge of theatre scheduling was not provided with the schedules from the secretaries and therefore was unable to perform her role. However, when it became clear that this was not going to be acceptable, the secretaries revised their strategy and all sent their schedules in together, so that the new administrator was overwhelmed by the workload. As one project member put it, "they were wanting her to sink."

There was also resistance from some local optometrists. For example, the transformation team member recounted the story of an optometrist with a large local practice who refused to participate. As luck would have it, the transformation team member happened to need a new pair of spectacles and so decided to visit the reluctant optometrist and sang the praises of the new cataract procedure throughout her eye exam. By the time her spectacles were ready, the optometrist had reconsidered his position.

While the redesigned cataract process was considered to be highly successful in the hospital where it had been developed, the diffusion of this newly designed process to other hospitals was extremely problematic. For example, in one hospital which had been sent the paperwork about the new process in East General Hospital, the idea had been rejected because it was seen as "too radical." Indeed, even within East General Hospital itself, consultants who had not been involved in the reengineering project still assumed that optometrists could not properly diagnose cataracts and continued to want to see all patients themselves to make the diagnosis. Recognizing these problems, significant effort was put into capturing and disseminating user-friendly documentation, and "blueprints" (referred to as the "Roadmap") for implementing the new "best practice" cataracts treatment process in other hospitals. However, these were having relatively little impact. Faced with this, the transformation team hosted a number of networking events aimed at explaining and illustrating the process "live" to members of other hospitals. Whilst this generated significant enthusiasm at the events themselves, still relatively little happened and, two years on, East General Hospital remained the only one to have implemented the new process.

3 Production Perspectives

"Production" perspectives are underpinned by the assumption that knowledge, like other resources (labor, finance, capital), operates as both an input to and an output of production and that, in the current era, the knowledge resource is a major source of competitive advantage (Drucker, 1993; Alavi and Leidner, 1999). Logically, then, KM, in other words, managing the knowledge resource, becomes a core management activity. This perspective essentially takes an "entitative," "information processing" view of knowledge and KM—knowledge, like information, is depicted as a thing to be accumulated, transferred from place to place and converted from one form to another (Hosking and Morley, 1992). However, unlike other resources, knowledge is also recognized as having intangible characteristics and effects. For example, it is often "tacit," or "embrained" in the heads of employees (Blackler, 1995). Therefore, critical tasks of KM include making these tacit features explicit and finding ways to assess or measure the impact they have on the production process. KM, therefore, centers on the development of systems (primarily IT systems—databases intranets and so forth) and mechanisms that increase the probabilities of capturing and transferring knowledge, as well as new accounting methods for measuring intangible assets. In the Cataracts case, the attempt to capture knowledge about the new process in the form of the Roadmap which could then be transferred to other hospitals is indicative of this kind of approach.

Production perspectives on knowledge and KM have been characterized, and also critiqued, by a number of writers on KM under different labels.

McElroy (2000), for example, refers to this approach as "first generation KM"; Hansen et al. (1999) refer to "codification" strategies; Swan et al. (1999) use the label "cognitive" (see also Newell et al. 2002); and Alavi (2000) describes it as the "repository" approach. These authors also note the dominance of production perspectives in early articles written on "knowledge management" (Scarbrough and Swan, 2001; McElroy, 2000). For example, Scarbrough and Swan (2001) found that, whilst the problems of managing knowledge had been a core issue in management for a long time (since Taylor's time and beyond), the mid 1990s saw an exponential growth in articles written on "KM" and around 70% of these were focused on the capture and transfer of knowledge through the use of information technology. It is probably no coincidence that this heralding of "KM" aligned with a concurrent upsurge of interest in the "knowledge-based economy" and the "resource-based view of the firm" and significant advancements in internet technology. It also chimed well with the traditional artifact-based model of innovation, which saw innovation as more or less linear process involving the creation and transfer of technological artifacts from one location (e.g., in scientific laboratories) to another (e.g., in industrial firms). A common feature of these different areas of interest was an emphasis on knowledge accumulation and transfer.

Sometimes production perspectives are also sensitive to the fact that, unlike other resources, a significant amount of knowledge is not actually owned, or controlled, by the organization. Rather, because of its tacit qualities, important knowledge resources reside with individuals. Individuals may choose, or not, to share their knowledge with others, or may leave the organization. This makes the organization vulnerable to the problems of not being able to exploit its knowledge resource, or seeing it, literally, "walk out of the door." KM, then, is presented as the solution to this problem—through IT systems, it is assumed, the tacit knowledge of individuals and groups can be captured, made explicit and converted into an organizational resource. The focus on using IT to systematize knowledge has strong resonance with earlier Scientific Management approaches to dealing with the vagaries of craft-based production and craft workers.

In sum, then, the assumptions underlying the production perspective are that: (i) knowledge lies in the heads and minds of individuals; (ii) creating and transferring knowledge involves the conversion of one type (e.g., tacit) to another (e.g., explicit); (iii) valuable knowledge can be objectified (it can be captured); (iv) knowledge is functional (i.e., it is fundamentally good for innovation); (v) innovation involves a linear process of creating knowledge in one place and transferring it to another and; (vi) knowledge management activities involve the development of systems and processes to help the capture and transfer of knowledge. Broadly speaking, the dominant paradigm underpinning these assumptions is functionalism (Burrell and Morgan, 1979) and the dominant epistemology is a "knowledge as possession" view (Cook and Brown, 1999)—i.e., knowledge is seen as a resource possessed by individuals, groups, and organizations. Nonaka and

Takeuchi's (1995) "knowledge creation cycle"—focusing on the conversions between tacit and explicit knowledge—echoes elements of this view (despite claims to its socialized nature).

Entitative assumptions about the status of knowledge as an object, or variable, to be manipulated to achieve certain ends, have been challenged by interpretive paradigms and social constructivist theories which highlight the inherently subjective, and highly equivocal, nature of knowledge (Weick, 1990; Bijker et al. 1987). For example, the "knowledge as possession" view (e.g., Blacker, 1995; Tsoukas, 1996), has been criticized for failing to address the situated nature of knowledge in social and organizational context (Tsoukas and Vladimirou, 2001; Lam, 2000). The linear view of innovation and the knowledge conversion process has also been subject to debate, with critics arguing that linearity is little more than a feature of retrospective and rationalized descriptions of innovation and knowledge creation processes. These descriptions, it is argued, gloss over the discontinuities, iterations and political uncertainties that characterize all but the most simple innovation processes (Clark, 2003). For example, in the Cataracts case, political uncertainties amongst optometrists and secretaries played a key role in both shaping and interrupting the innovation process.

A number of writers have pointed out that too great an emphasis on stockpiling knowledge, as a valuable resource in its own right, risks divorcing KM from outcomes (McDermott, 1999). For example, there is no particular reason, a priori, why innovation should follow from capturing and transferring more and more stocks of knowledge. Rather, information overload and existing knowledge might, quite conceivably reduce innovative capability. For example, in the Cataracts case, knowledge produced in the form of new forms and templates was able to be used by the consultants and optometrists within the East Midlands hospital because, by working together, they had come to reframe the problems they were dealing with. However, despite being available, this knowledge was not useful to similar groups in other hospitals who saw the problem through their own existing frames of reference. Thus knowledge should not be seen as valuable in itself, but as adding value only where applied for specific tasks (McDermott, 1999). This has led to the development of more sophisticated contingency theories that link different strategies for managing knowledge to specific aspects of the tasks at hand. For example, Hansen's (1999) study of innovation in a large electronics company concluded that strong ties were beneficial where tasks require the transfer of complex (often tacit) knowledge, whereas weak ties were more efficient where the knowledge involved was less complex (often explicit).

As well as these theoretical objections, there are practical concerns with the production approach—KM initiatives based on this kind of thinking frequently fail (Walsham, 2002). In one empirical study of an initiative to encourage knowledge transfer in a world-wide bank, Newell et al. (2001) found

that the introduction of a KM system actually had the opposite effect to that intended by senior management. In this case, intranet technology was introduced to encourage global knowledge sharing. However, once available, this technology infrastructure was appropriated and deployed very differently by the different groups and divisions in the bank with the result that, instead of encouraging knowledge sharing through one global intranet, more than 150 different intranets were developed, effectively strengthening the boundaries and divisions around existing groups with "electronic fences."

3.1 Implications for KM at East General Hospital

As seen, the production perspective can be seen in some of the thinking of transformation team members at East General Hospital and, despite criticisms, is also pervasive in many KM initiatives (Newell et al. 2002). For example helped by the transformation team, knowledge about the new treatment process was captured in the form of new assessment forms and Roadmaps, supported by objective measures of the effectiveness of the process (e.g., patient satisfaction scores and waiting time measures). Indeed the very idea of the transformation team—to roll out best practice invented in one hospital to be used in another—is also a reflection of the linear, production view. For East General itself, these objectified forms and Roadmaps were helpful in developing the new treatment process and in negotiating the roles and responsibilities of different specialists. However, the limits of this approach are also evident in the Cataracts case. In particular the Roadmaps were unable to be adopted by other hospitals, and the measures of success were read by some with disbelief. Even those consultants and optometrists that could see that the new system was actually working at East General, then failed to appreciate how it could be made to work in the context of their own hospitals (East General being painted as somehow "special"). The response of the transformation to these issues was to "step up" their knowledge transfer activities and improve the information. However, this had little effect.

A critical problem in this case was that, whilst these objectified forms and templates were able to depict what the new system should look like, they failed to capture the processes by which this knowledge had been produced. These included, for example, intensive negotiation and trust building, personal networking, and informal opportunistic meetings, such that the different specialists involved came to appreciate one another's perspectives and to develop a more collective understanding of the treatment process. In other hospitals, where traditional methods were still used and this collective understanding had not been developed, even with the best intentions, the specialists could not appreciate how to apply the new template in their own context (Newell et al. 2003).

4 Process Perspectives

The critique of production perspectives, and the oft-associated failure of IT-led KM initiatives, has helped to fuel a shift toward accounts of KM that take as their focus the development of social processes and contexts capable of supporting KM. This shift toward process perspectives can be seen in organization theories, which focus on "knowing" as a social and organizational activity, in contrast to "knowledge," as an object (Gherardi, 2003). Thus, Tsoukas and Vladimirou (2001) theorize knowledge as "the individual ability to draw distinctions within a collective domain of action, based on an appreciation of context or theory or both" (p. 979). This clearly locates knowledge in the domain of social activity and context (i.e., the collective). Processual accounts draw heavily from theoretical traditions of social constructivism, seeing knowledge, or knowing, as a process of "sensemaking," whereby interacting actors within particular social contexts come to negotiate understandings of the world (Berger and Luckman, 1966; Weick, 1995). Knowledge is, therefore, equivocal (subject to different meanings and interpretations), dynamic (accepted meaning changing as new actors and contexts are brought to bear) and context-dependent (difficult, if not impossible, to separate from the context in which it is produced). These features of "knowing" can clearly be seen in the Cataracts case where, for example, the new treatment process was interpreted differently by the different groups involved, became reframed over time (for example, by the reluctant optometrist), and where interpretations were tied closely to the context in which the knowledge had been produced.

The shift from production to process accounts is also reflected in major typologies of KM. For example, McElory (2000) describes "first generation" KM as focusing on the supply and dissemination of knowledge (i.e., the production view) and "second-generation" KM as focusing on creating and maintaining the social conditions required for "knowing." Second-generation KM recognizes that knowledge is context-dependent, since "meanings" are interpreted in reference to a particular paradigm (Marakas, Johnson and Palmer, 2000; Shariq, 1998). Similarly, Swan et al. (1999) distinguish between "cognitive" and "community" approaches to KM, with the latter depicting knowledge as constructed through shared experiences and participation in social groups and networks. Hansen et al. (1999) contrast "codification" and "personalization" strategies, where personalization is about encouraging participation in social networks and learning through dialog. And, in relation to IT-based KM systems in particular, Alavi (2000) distinguishes between "repository" and "network" approaches. The former, in line with a production view, involves building knowledge repositories, retrieval technologies, and document management systems, whereas the network model, premised on a process view, uses technology to connect people and build on-line communities.

In terms of the links between knowledge and innovation, whereas production approaches see a direct relationship between an increased quantity of knowledge stocks and innovation (Amidon, 1998), process accounts view such links as socially and politically mediated. Thus, innovation is seen as: "the development and implementation of new ideas by people who over time engage in transactions with others in an institutional context" (Van de Ven, 1986). Such accounts view innovation, not as involving the transfer of knowledge from one type or location to another, but in a dynamic way, as involving the coming together of different organizational tasks, multiple actors, and multiple forms of knowing (Clark and Staunton, 1989). Whether or not knowledge generates innovation depends, then, on both the particular interests and interpretations of actors that interpret, produce and legitimate it, and the social and institutional contexts in which actors are located. For example, Clark (1989; 2003) describes how innovation, in the form of the US game of American Football, emerged originally from the UK game of Rugby. However, it was not simply a case of capturing knowledge about the game in the UK and transferring this to the US. Rather, this knowledge had to be appropriated for the US context. In particular, the involvement of key stakeholders (e.g., US media, sports promoters and advertisers) led to "pivotal modifications" in the game (e.g., the introduction of shorter periods, kick forwards, and "time-outs") in order to adapt it for the US (Clark, 1989). Similarly, in the Cataracts case, both the development of the innovation, and the failure to appropriate it in other hospitals reflected, in large part, the vested interests and interpretations of the different groups of specialists involved. For example, the secretaries initially interpreted the new system as making their own jobs more difficult and, so, attempted to usurp it. Also, the performance measures produced in East General were not seen as legitimate in the context of other hospitals, in part because it was not in the interests of those in other hospitals to admit to relatively poor performance.

These examples highlight the central role of social networks, in translating (not just transferring) knowledge in such a way as to promote the interests of particular social groups, as well as the need to take into account variation in the institutional contexts in which they are located. For example, in the Cataracts case, networks were used extensively by the transformation team member to legitimate the new process and mitigate conflict. Recognizing that the links between knowledge and innovation are socially and politically mediated, also provides some clues as to why it is that many innovation processes (including KM initiatives) fail, despite knowledge being apparently available. For example, the Qwerty keyboard—originally required when typewriters used mechanical "hammers" for letters—has continued to be dominant to this day, despite evidence that an alphabetic keyboard would be more efficient because numerous social groups (e.g., teachers, manufacturers, trained typists) have a vested interest in maintaining the status quo (Rogers, 1995).

Practically speaking, process approaches to KM focus on knowledge sharing and translation, rather than knowledge transfer. The major task for

KM, then, is to build "boundary spanning" mechanisms for connecting social groups and interests and for developing shared understandings, identities and perspectives (Boland and Tenkasi, 1995). The recent surge in management initiatives aimed at building, so-called "communities of practice" (Wenger, 1998), or initiatives aimed at "social network analysis" (Cross and Sproull, 2004) reflect such a view. Similarly, "second generation KM," "community" (Swan et al. 1999), "network" (Alavi, 2000) and "personalization" (Hansen et al. 1999) strategies all emphasize the value of creating opportunities for the development of social networks and trust-based relationships (e.g., Gupta et al. 2003), since it is through such relationships that new meanings and understandings can come to be shared and applied to tasks. KM tools might also include the development of IT, not as a means to transfer information, but rather as a means to establish and reinforce social networks and communities, and a context for knowledge sharing.

4.1 Implications for KM at East General Hospital

The process perspective is clearly a useful lens through which to see the issues encountered at East General Hospital. They stress, for example, the inherently uncertain, open-ended and politicized nature of knowledge and innovation. Here, then, a process model of innovation as involving a set of complex and recursive interactions among different sub-groups, agendas and forms of knowledge (e.g., consultants, optometrists, secretaries, nurses), is perhaps a better account of what happened (e.g., Clark et al. 1992; Garretty and Badham, 2000). According to process perspectives, knowledge is subjective and privileges the meanings and interests of particular powerful social and professional groups. The failure of the secretaries to effectively resist the new system, for example, is a reflection of their relative lack of power in the face of other professional groups.

Recognizing the social and politicized nature of innovation means that attempts to manage knowledge would need to be sensitive to the interests and interpretations of the different groups involved. Whilst this sensitivity was clearly displayed in the process of creating knowledge within the East General team—for example, through the large number of meetings aimed specifically at sharing views amongst professionals—it was not so visible in the process of attempting to transfer this knowledge to other hospitals. The failure to transfer the, apparently, successful, new treatment, can be explained as a failure to take proper account of the culturally and politically mediated nature of organizational life (Newell et al. 2002). As Dougherty and Heller (1994) note, innovations fail because they "violate the existing systems of thought and action, or fall into a vacuum where no shared understandings exist to make them meaningful" (p. 201).

A practical implication of a process view for KM in this case might have been to establish closer social ties linking members of the East Midlands team with groups of specialists in other hospitals. As Boland and Tenkasi

(1995) notes, in organizations the problem of sharing knowledge "is not a problem of simply combining, sharing or making data commonly available. It is a problem of perspective taking in which the unique thought worlds of different communities of knowing are made visible and accessible to others" (p. 39). However, it is also worth noting that, even where specialists in other hospitals did share an understanding of the new system, and could see how it would benefit their own hospitals, they still had difficulties putting this knowledge into action. In other words being able to understand and translate the knowledge was not sufficient to transform this knowledge into action within their own contexts. Practice perspectives, which we will next examine, provide further insight into these problems.

5 Practice Perspectives

During the last two decades, practice perspectives have emerged as a particular way of thinking about social and organizational life (Schatzki et al. 2001). However, whilst becoming popular (recently, increasingly so) amongst scholars in social and organization theory, practice perspectives have received relatively little attention in KM theory and practice. Such discussions that do exist note the need to cultivate and manage "communities of practice" to encourage learning and innovation (e.g., Wenger & Snyder, 2000; Lesser and Everest, 2001). Yet these discussions tend to focus more heavily on "community" aspects (e.g. social network and identity building) than "practice" aspects of communities of practice. Management initiatives (e.g., in large multinationals like Shell and BP) aimed at building communities of practice similarly focus more on network building than practice. As a result they tend to neglect critical issues such as: the tensions between work, professional and management practices; the feasibility of "managing" communities of practice; and the role of material, non-human entities through which practices play out (Swan et al. 2002; Fox 2000; Orlikowski, 2005; Carlile, 2002, 2004). Of course, the boundaries between practice and process perspectives are undeniably blurred—both see knowledge and action as socially and culturally embedded and embodied and also emphasize the dynamic and subjective nature of knowledge, for example. However, practice perspectives draw closer attention to particular aspects of social phenomena that have not, perhaps, been sufficiently addressed to date, at least in terms of thinking about KM and innovation.

    Before moving on, it is worth pointing out that theorists that have played a major role in informing practice thinking are part of a very broad church indeed, including social philosophers (e.g., Wittgenstein, 1958; Dreyfuss, 1991), social theorists (e.g., Bourdieu 1990; Gherardi, 2001), cultural theorists (e.g., Lyotard, 1988) and ethnomethodologists (e.g., Garfinkel, 1967; Heritage, 1984). These theorists have informed thinking on a very broad range of issues and social phenomena and it is impossible to do them, or the diversity in

their theories, justice here. However, at a more general level, it is possible to indicate what practice perspectives seem to have in common (borrowing from Schatzki, 2001) and also what insights they might add to our understanding of knowledge, KM and innovation that production and process accounts do not, or not so centrally, address.

First, unlike process perspectives, which tend to depict social context in rather broad and inclusive terms (including systems, structures, relationships, technologies and artifacts, for example), practice perspectives draw closer attention to the "materiality" of social activity (Schatzki, 2001; Orlikowski, 2002). Practice perspectives emphasize, then, the interweaving of human activities with non-human, material configurations, albeit differing in their accounts of how this interweaving takes place (the importance of human versus non-human agency, for example, being a point of contention—Latour, 1988). According to practice perspectives the social world is seen as "a field of embodied, materially interwoven practices centrally organized around shared practical understandings" (Schatzki, 2001, p. 3). This view contrasts, both with production accounts—that tend to privilege individual cognition—and also with process accounts—that tend to privilege social relations and interactions, individual and collective interpretations, language and symbolic signifiers, and social roles and structures (Schatzki, 2001).

Practice perspectives on knowledge and innovation stress, then, the need to take seriously the materiality of everyday life as both constitutive of, and constituted by, social activity. Objects such as technological artifacts, for example, are not merely deployed by individuals and groups to achieve particular ends, they are also an essential part of practice and so set limits around what change in practice is possible. For example, Orlikowski (2005) describes the ways in which material entities (laptop computers, internet connections, phone lines, cables, connectors, pens, mute buttons on telephones)—or in her terms, the "stuff" of everyday life—act as "scaffolds" for social activity (in her case, an on-line business meeting). She uses the metaphor of "scaffolds" to highlight the ways in which temporary clusters of material entities help constitute particular kinds of social activity in real time, but are also a result of them. Similarly, a practice perspective on the Cataracts case might highlight the ways in which existing practices for diagnosing and treating patients are entwined with material entities—such as the equipment of optometrists and general practitioners, theatre schedules, appointment systems and telephones used by secretaries—which, together, shape the introduction of new practices. This has important implications for KM and innovation, since it means that the propensity, or lack thereof, to transform knowledge and change practices reflects to some extent, what Schatzki (2001) describes as the "solidifying inertia" of material layouts (p. 3). It also means that material entities and objects may provide critical tools for KM as a means of transforming knowledge and practices.

Second, practice perspectives on knowledge and innovation stress the need to understand social phenomena, including such things as knowledge

and innovation, as aspects of "fields of practices." For example, scientific knowledge is part of a broader field of scientific practice, including epistemic practices that determine how knowledge is produced (e.g., via the scientific method) and what is considered legitimate (Knorr-Cetina, 1999). As Schatzki (2001) notes, the "field of practices"—the total nexus of interconnected practices—is the "linchpin" of practice-based accounts. The notion of "field of practice" appears to be roughly equivalent to, what process theorists might refer to as, "context." However, practice theorists stress that practices are not just embedded within context, but also create context. Hence definitions of "practice" include "action informed by meaning drawn from a particular group context" (Cook and Brown 1999) and/or "socially recognized forms of activity, done on the basis of what members learn from others, and capable of being done well or badly, correctly or incorrectly" (Barnes, 2001, p. 19).

These definitions highlight the embodiment of individual practice (e.g., an action or activity) in a broader field of collective practice (e.g., professional practices) which is both constituted by, and constituent of, that practice. Take, as in the cataracts case, the practice of an individual recording a diagnosis of "cataracts" on a patient. In practice terms, this is understood both as constitutive of medical practice (i.e., diagnosis is socially recognized as an integral component of what medical professionals do) and also constituted by medical practice (i.e., medical professional practices provide the major and immediate context in which diagnostic practices are formed, negotiated, shared and understood). The practice of diagnosing, therefore, occurs within, but also creates, the field of medical professional practice. Taking this view allows us to see why it is that the introduction of, what might be considered a relatively straightforward and advantageous change process, was so contentious. In particular, the new system of cataracts treatment transferred the practice diagnosis from individual consultants to optometrists, thus threatening to violate a whole system of well-established, and collectively agreed practices around roles and responsibilities of the medical professionals. This also helps to explain why professionals in some other regional hospitals were not willing to accept the knowledge generated from the Cataracts project.

Third, practice-based studies illuminate the "stickiness" of knowledge and the unevenness of knowledge flows, precisely because of its dependence on practice. Like process perspectives, which see knowledge as socially embedded, practice perspectives see knowledge as situated in localized practices and innovation as emerging within specialized communities of practice through the improvised responses that individuals make to local problems (Lave and Wagner 1991; Lam 1997). The localization of knowledge within communities of practice makes knowledge paradoxical in relation to innovation. On the one hand, the creation of specialized knowledge promotes innovation within communities. However, on the other hand, the "knowledge boundaries" created by specialization pose barriers to innovation processes that cross communities (Brown and Duguid, 2001; Carlile, 2002). As Carlile (2002) notes "the irony is that these knowledge boundaries are not only a critical challenge,

but also a perceptual necessity because much of what organizations produce has a foundation in the specialization of different kinds of knowledge" (p. 442). In short, divisions of practice generate divisions in knowledge, so that it is hard to share knowledge where practice is not already shared (Carlile, 2002). Brown and Duguid (2001), for example, argue that knowledge flows are channeled by shared practice, noting that: "If knowledge leaks in the direction of shared practice, it sticks where practice is not shared" (p. 207).

Again, in the Cataracts case, after initial meetings, knowledge flowed fairly freely amongst the team of different specialists at East General. However, knowledge did not flow easily from this team to groups of specialists in other hospitals. Paradoxically, one result of the intensive collaboration and knowledge sharing within the team, was that, whilst they were able to develop new shared working practices around diagnosis and treatment, these localized practices were then even further separated from the mainstream traditional practices used elsewhere in the NHS. Since knowledge sticks at boundaries of practice, this made knowledge transfer even more difficult. Hence learning within the team generated barriers to learning from the team to other parts of the NHS. Thus a practice view highlights the problems of "learning boundaries" in innovation—boundaries to the transfer of knowledge and learning that are themselves a product of knowledge and learning (Scarbrough et al. 2004).

Fourth, practice perspectives emphasize, not just the socially situated nature of knowledge, but its .... in practice (Carlile, 2002). Practices take time to develop, to embed and consolidate. Practices, like diagnostic practices, also become institutionalized—different groups, including managers (Lyles & Schwenk, 1992), professionals, scientists (Knorr-Cetina, 1999) and technicians (Orr, 1990) develop distinctive perspectives, or worldviews, which become .... over time in their practices and shape their interactions with other groups (Carlile, 2004). Moreover practices are nested—they depend on, and make possible, other practices. The field of interconnected practices means that change in one area of practice potentially disrupts a wide range of other practices. Coupled with this, actors with particular interests invested in their practices will also seek to sustain power and control within their own knowledge domains and over their own work practices (Carlile, 2002). Medical consultants, for example, in part derive their professional power by retaining control over the diagnosis of patients and so, may be resistant to any change that threatens to undermine this power (Swan et al. 2002).

5.1 Implications for KM at East General Hospital

Relating practice perspectives to KM and innovation, it can be seen that innovation—especially innovation that cuts across established practices as in the Cataracts case—by definition, needs practices to change. Existing knowledge and practices need to be displaced, transformed (in Gidden's terms "disembedded") to make room for new practices (Giddens 1984).

This highlights both the discontinuous, non-linear, nature of knowledge and innovation, but also the disconnects between knowledge and innovation. For example, even with the best designed KM initiatives, even where different groups come to understand and appreciate one anothers" perspectives, and even where there is significant commitment to change, change itself is difficult. This is, in part, because invested practices need to be divested. For example, in the Cataracts case, even where professionals in other hospitals saw the need for change and understood what was required, they were still unable to implement change within their own "field of practices." In sum, whereas production and, to a lesser extent, process accounts see the creation and flow of knowledge and innovation as a relatively seamless, or smooth, process, provided appropriate conditions and processes are in place (e.g., Nonaka, 1994; Zollo and Winter, 2002), practice perspectives highlight the patchy, uneven and discontinuous nature of knowledge and innovation due to investments in practice.

Practice perspectives highlight the possibility for objects (including KM technologies) to play a critical role in KM (Carlile, 2004). As seen, practices are in part constituted through material non-human entities. This means that objects (including discursive objects) could play a critical role in constituting and transforming practices. In the Cataracts case, the forms designed by the project team played a number of important and diverse roles. Firstly, they revealed what kinds of practices currently existed, including the interdependencies between the practices of the different groups involved (e.g., consultants and optometrists). Secondly they revealed gaps in understanding and encouraged "perspective taking" across specialist groups (Boland and Tenkasi, 1995). Third, they engaged different specialist groups in the process, so encouraging commitment. Finally, they generated a new set of collective practices around diagnosis and assessment. Thus, whereas KM initiatives based on production perspectives see objects (e.g., technologies, reports, databases) as a means of transferring knowledge, practice perspectives alert us to the possibility for objects to be deployed to progressively transform knowledge.

Looking more closely, Carlile (2002) presents a typology of different kinds of knowledge boundaries and associated boundary objects that might be useful to consider in thinking about KM (see also Star and Griesemer, 1989). The first type—the syntactic boundary—refers to differences centerd in grammar, symbols, labels and languages. Here, the problem of knowledge sharing amounts to being able to "match differences" by using a common syntax across the boundary between the message "sender" and message "receiver." Where practice is, to some extent, shared, Carlile argues that it might be possible to transfer knowledge provided that syntax is shared. The role of objects, then, is to develop a common syntax. However, a common syntax does not necessarily mean that actors understand objects in exactly the same ways. Thus, at the syntactic boundary objects "do not convey unambiguous meaning, but have instead a kind of symbolic adequacy that enables conversation without enforcing commonly shared meanings" (p. 362 Boland and Tenkasi, 1995).

For example, in the Cataracts case patient information and referral databases helped to establish common practices across consultants and optometrists for structuring information. This, in turn, promoted knowledge (or information) transfer across these groups (Briers and Chua, 2001). However, it does not mean that the information taken from the database will necessarily be interpreted and deployed in the same ways by these different groups or by groups in other regions.

Semantic boundaries refer, then, to differences in accepted interpretations and meanings amongst actors at a boundary (Carlile, 2002). At semantic boundaries, the critical issue for KM appears to be "perspective taking"—the process whereby social communities come to recognize and accommodate differences in interpretations such that "the unique thought worlds of different communities of knowing are made visible and accessible to others" (Boland and Tenkasi, 1995, p. 359). Translating, rather than transferring, knowledge is central. At a semantic boundary, objects (however, interpreted by actors) may help to reveal and accommodate differences in perspectives and, so, "reconcile differences in meaning" (Nonaka and Takeuchi 1995). Thus, in the Cataracts case, the use of various tools and protocols (e.g., standardized forms, process diagrams and templates) played a critical role in revealing and reconciling differences and translating knowledge across specialist groups (see also Carlile, 2002; Wenger & Snyder, 2000). Since objects are themselves social constructs, there is clearly also a relationship between human agency and the translational capability of objects. For example, studies of communities of practice highlight the roles of intermediaries or "knowledge brokers" in the development of communities (Wenger & Snyder, 2000). Also, objects that have sufficient "interpretive flexibility" to be seen as "desirable" across groups with different interests and political agendas—such as, in this case, the "transformation team" itself—may play a powerful role in generating commitment to a shared course of action.

A third, and less well recognized, knowledge boundary is pragmatic which, as Carlile (2002) notes, stems from the investment of knowledge in practice, discussed earlier. This recognizes not just differences in meanings, but also the considerable effort and history invested in practices and the interdependencies between practices. For example, in attempting to resist the change, secretaries at East General realized that hospital practices for theatre scheduling were dependent on their access to individual consultants' diaries. A critical role for objects at pragmatic boundaries is knowledge transformation—i.e., to encourage specialists to translate each other's knowledge and practice and also to transform their own practices as a result. Here, then, important objects for KM could include maps or "coincident boundaries" (Star, 1989). These are objects—such as work plans, flowcharts, and process maps—that, both specify differences in world views and also specify interdependencies between them (Gerrarty and Badham, 2000). Such objects might, for example, have been useful in the Cataracts case for making knowledge from the East General case actionable within other hospitals. However, those responsible for KM need

also to be aware that objects (including KM systems themselves) can also be sites for significant conflict—"creating and reshaping boundary objects is an exercise of power that can be collaborative or unilateral" (Boland and Tenkasi, 1995, p. 362).

6 Conclusions

This chapter has explored different perspectives on knowledge management— termed here, production, process, and practice perspectives—noting that these tend to be underpinned by different epistemological and ontological assumptions. Using the Cataracts case, I have shown how each perspective implies its own set of core issues and approaches to KM. These different approaches are summarized in Table 1, below. However, none of these approaches should be thought of as universally applicable. Indeed, one of the problems with the KM literature, to date, has been the movement from one generalized set of prescriptions (e.g., first generation KM) to another set (e.g., second generation KM), with relatively little attention to how these different approaches interact, complement and possibly contradict one another. What might be more useful is to think about the particular purpose that these different practices of managing knowledge intend to serve at different points of time.

For example, each of the perspectives overviewed here develops some aspect of the distinction between "knowledge as possession" and "knowledge as practice" (Cook and Brown, 1999). Yet, in reality, knowledge usually combines possession and practice. Thus, Tsoukas (1996) argues that tacit and explicit knowledge are "mutually constituted." Taking this on board, Cook and Brown (1999) argue that these two views of knowledge are, in fact, mutually compatible rather than mutually exclusive, representing distinctive, but related, epistemologies. Thus, they argue, knowledge as something possessed must be practiced in a specific context to be meaningful. Knowledge objectified in the form of tools, languages, and material artifacts could, according to this perspective, act as "tools of knowing" (Cook & Brown, 1999).

Of course, as with any perspective, practice based perspectives on KM and innovation have some limitations. For example, because studies of practice tend to direct attention to the localized practices and knowledge sharing within communities, they sometimes neglect the ways in which practices develop, or become institutionalized, across communities. As Fox (2000) notes, "communities of practice theory tells us nothing about how, in concrete practice, members of a community change their practice or innovate" (Fox, 2000: 860). The tendency to conflate knowledge and practice also runs the risk of losing the insights made possible by the analytical separation between them. That said, practice-based thinking on KM could make a distinctive contribution by differentiating those forms of knowledge that are acquired individually and those acquired collectively. As Cook and Brown (1999) note,

Table 1. Production, Process and Practice Perspectives

	Production	Process	Practice
Major view of the social	Individual cognition located in an objective external world	Individual & collective interpretations embedded in social interactions, roles & structures	Materially interwoven (human & non-human) practices centrally organized around shared practical understandings
Understanding of Knowledge	Knowledge as an object; a resource to be accumulated, captured, transferred	Knowing as a social & organizational activity Socially constructed through interactions in particular contexts	Knowing as practice ("knowledgeability") Constituted by and constituting fields of interconnected practices
Locus of knowledge	Embrained in heads of employees	Embedded & encultured in social context	Embedded, embodied and invested in practice
Understanding of innovation	Linear process where knowledge is created in one place and transferred to another	Episodic, recursive, iterative process involving interactions of organizational actors, tasks and multiple forms of knowing	Emerging within specialized communities of practice through the improvised responses to local problems
Link between knowledge and innovation	Knowledge is directly related to, and functional (good) for, innovation	Relationship between knowledge and innovation is socially & politically mediated: innovation reflects interests of powerful groups	Relationship between knowledge and innovation mediated through practice: knowledge/innov-ation sticks at practice boundaries

Table 1. (continued)

	Production	Process	Practice
Major focus of knowledge management	Transfer/conversion of knowledge from one type (e.g., tacit to explicit) or location to another	Sharing, translation & legitimation of knowledge amongst interacting groups	Transformation of knowledge through overlapping practices
Major tasks of knowledge management	Capture/transfer of knowledge (using IT)	Building networks, communities, trust	Overcoming practice boundaries, e.g., using objects

the craft elements of practice are acquired individually but the knowledge of what constitutes "acceptable" practice is developed and negotiated collectively, amongst a particular group or community. They may also forge a bridge between approaches to KM that see knowledge as either an objective entity—the production view—or as entirely subjective, constructed through human social interaction—the process view.

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Where and When was Knowledge Managed?
Exploring Multiple Versions of KM in Organizations

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Abstract: The chapter presents a case study of new technology in a rapid response social work unit that is part of an e-government program in a Scottish municipality. The objective of the project was to improve the configuration and delivery of resources for housebound clients, and it was construed as a simple knowledge integration exercise by senior management. Taking a social informatics perspective, the authors interpret the case in terms of competing discourses or multiple versions of KM, and suggest that KM versioning is a characteristic, but underexplored, feature of complex projects that involve multiple actors with different knowledge trajectories.

1 Introduction

The chapter explores a case study of a knowledge management project in a municipal public administration in the UK. The case is an instance of service transformation that is driven by major societal programs (e-learning, e-government) initiated by governments within the European Community and elsewhere to enact an "information" or "knowledge" society (Van Bastelaer, 2001). Many of these programs are based on the assumption that knowledge has not been "managed" in the relevant sectors, or that it has been inadequately managed. They are also premised on assumptions about the relationship between knowledge, technology and work that are as much ideological as rational in intent (Davenport & Horton, 2005).

One way to address the intricacies of knowledge management in cases like this is to consider them in terms of versioning. The first section of the chapter explores an extensive and contradictory literature that presents different versions of KM, and raises a number of questions. If knowledge can be shown to have been managed in the case organization before the implementation of government directives, then for whom was the managerialist version, a discourse of "prior incompetence" intended? And for whom was the discourse of "competent intervention" intended, one that was more or less compromised

by "where and when" narratives that emerged in fieldwork? Does KM inevitably involve multiple versions and diverse discourses, some of which gain salience in specific circumstances according to the prevalent political forces in different localities at different times in a KM project?

In a world where multiple accounts (or versions) of KM are available and multiple audiences are addressed, what can a researcher achieve? The second section of the chapter presents a research approach that can accommodate and explicate multiple versions of KM. As analysts working in the Social Informatics domain, we provide a framework that draws on concepts and techniques from our fellow researchers. These provide explanations of sociotechnical phenomena in organizations that span different levels of organizational order, and different timeframes. They allow an analyst not just to identify, and explain conflicting versions, but to track what we call knowledge trajectories, shifts in versions of KM over time which are rarely smooth, as traces of earlier versions persist in later ones.

The case is presented in detail in the third part of the chapter. The starting point is a work environment before a major managerial intervention intended to improve, by means of technology, efficiency and effectiveness (with the parameters of the these qualities left unclear at the start of the projects, and, indeed, defined by external consultants once the projects were underway). The time frame of the case is years rather than months. It is clear that knowledge was managed at many different levels (the "where" of the title) and at many different stages ("when"). Before the intervention, for example, an organizational rationale had to be constructed and articulated, otherwise work could not have been approved that met, more or less, requirements to comply with government directives. One version of KM in the case study involves the work of outsiders hired to implement the (outsourced) systems to produce the desired transformation. Another is the knowledge managed by those whose work was to be transformed. Knowledge at this level could be described as a complex of elements such as professional expertise, organizational acumen and day to day practice, shifting in accord with evolving circumstances. Though many discrepancies can be observed between the different versions of knowledge managed by the "ordering" side and the "receiving" side of the technology implementation described in the case, continuity was broadly achieved through co-development and transformations of practice many of which were not anticipated. Some transformations however, can be seen as degradations rather than enhancements, altering the balance of professional and routine work, managing knowledge "down" rather than "up."

2 Multiple Versions of KM

The term "Knowledge Management" is used in diverse ways, a cause of controversy in the domain. Two broad (and related) analytic trends can be identified: the first is based on semantic analysis, or term occurrence in

relevant publications; the second is based on longitudinal empirical studies of organizational KM, and tracks divergence in usage over time. For some analysts, diversity is indicative of semantic breakdown. Wilson (2002), for example, speaks of the "non-sense of knowledge management." He bases his case on two lines of reasoning: firstly, you cannot manage something that you cannot define, and secondly, according to Wilson's own definition, knowledge is "in the head" and thereby not amenable to management. Wilson reviews occurrences of the term in different journals to demonstrate inconsistency in usage; the sample is based on his own sense of which publications are relevant to information science. In contrast with this approach, Schultze and Leidner (2002), analyzing the use of the KM term in MIS Quarterly, embed their analysis in organizational theory, and suggest that diversity of terminology is a positive quality not a weakness, and that polyvalent KM is a useful focal area for the exploration of a number of intersecting organizational phenomena such as organizational learning and absorption capacity. Ekbia and Hara (2004) discuss versions of KM in terms of the actors involved, focusing on what they call the "guru version." This theme has been developed more fully by Thrift (2005) who couples the occurrence of successive versions of KM with theoretical observations on what he calls "knowing capitalism," characterized by dynamic configurations and ephemeral management theorizing.

Thrift is one of a number of analysts such as Koenig & Srikantaiah (2004) and Huysman (2002) who consider diversity in KM over time, charting the development of KM in both management and academic domains in terms of phases. Huysman for example, describes a trajectory from KM as storage, through KM as sharing, to KM as reflective practice. Earlier phases of KM do not disappear as later versions appear: phases co-exist and the domain thus becomes more complex over time, though dominant or orthodox views can be identified at different periods (Kling and Ekbia, 2003). Within an organization, managers and policy-makers may adhere to different versions, a source of friction and contest in systems implementation.

A number of analysts working in the domain of critical management have focused on the political dynamics of knowledge management, specifically the issue of who decides what counts as knowledge, and thus, how "knowledge" is managed. (Prichard et al. 2000; Ekbia and Kling, 2003; Day, 2002). From this perspective, decisions made at one time and place will have outcomes at other times and places that do not reflect current power structures. Diversity and conflict in KM practice are inevitable. Difference may be actively creative (productive adaptation, situated action and so on) or destructive (Baxter, 2000) or passive, as in cases where those down the line remain in-different, and respond to change initiatives by continuing, as far as they can with the status quo (Horton and Davenport (2004) provide an example of this from the Scottish legal sector). In some cases, difference is due to time-lag: a KM policy initiated in one part of the organization may be perceived as arbitrary in another when it has been overtaken by events. Time-lags work in different ways: decisions about what counts as KM may

be embedded in software and other procedural artifacts—Bowker and Star (2000), for example, have demonstrated how classification has organizational consequences at many levels. Any current demarcation must work its way through an infrastructure of "congealed" policy and designs, the ghosts of earlier definitions, classifications and declarations.

The relationship between different versions of KM and different technologies is not straightforward. Though a specific version of KM may be used to justify investment in a specific ICT system, the coupling of the two is difficult to sustain in practice. In a world of configured systems, where components are assembled from different sources, under the control of third parties, what is implemented may not support the KM vision that triggers a given project. This is not a new phenomenon in systems implementation, but it is exacerbated when an originating version of KM is superseded. Though investment may be written off in small projects that were justified in terms of an earlier KM regime (Gallagher and Procter (2001) provide an example of this in an account of shifting techno-politics in a UK Bank), large technology implementations are less easy to discard, and cumulated legacy systems will further compound the problem of matching vision and practical outcome. Local institutional practice (what Kling and Scacchi (1982) call "packaging and fitting") is as much a site for knowledge management as the storage systems (intranets) or networks (collaborative work platforms) by means of which work gets done. Davenport (2002), drawing on cognate work in the domain of workplace studies (see Luff, Hindmarsh & Heath, 1997) suggests that observation of everyday practices ("mundane knowledge management") can usefully complement accounts of organizational knowledge more readily than those that focus solely on computer applications or specialist expertise.

An analyst may choose to set the starting point of a time-line of inquiry years before his or her current line of inquiry, or "take" on a field situation. From this perspective, KM is a process of unfolding or explication: a case unfolds, the timeline extends farther and farther back in time, and the question then arises of where to draw the boundary of the inquiry. The inquiry itself adds another layer of complication in the form of academic knowledge about what counts as knowledge, made explicit in artifacts—reports, research papers and so on—that must do their own work of persuasion. In a later section of the chapter we present a framework for exploring multiple versions of KM over time, that offers some guidance on how to bound an inquiry (Kling (1987) discusses this problem and suggests that boundaries will establish themselves). We suggest that tracking such knowledge trajectories can explain some of the organizational puzzles that emerge in KM initiatives. Though these are often explained in terms of unintended consequences, we suggest that these are on occasion the consequences of "forgotten" or "past" intentions.

A number of recent organizational studies have explicitly explored timing (see the journal ⋯ ⋯ , 11(6), 2004) and suggest that it is difficult to integrate accounts of knowledge work that address the phenomenon in different time frames. Widen-Wulff and Davenport (2005) have drawn on this

work in a comparative study of KM in communities of practice in two very different Finnish organizations—a long-established insurance claims handler and a hi-tech start-up enterprise. There is, in addition, a long tradition of work that may be seen as longitudinal KM analysis. One approach is to focus on knowledge trajectories within one organization: an example is Bowker's (1994) organizational biography of Schlumberger. Another is to take an important institutional form, the clinic or the prison, as in Foucault's "archaeological" accounts, or Yates's (1993) study of the 19th century "office." A third is to take a computerization movement (Iacono and Kling, 1994) such as teleworking, or e-government or e-learning or e-science and unpack the work that makes one version of knowledge the dominant form—by tracking the histories of positions, resistance, alignments and diffusion. Other studies take a medium term view: examples are work on domain cultures such as Knorr-Cetina's (1999) account of the high energy physics community, or Latour and Woolgar's (1979) ethnography of the Salk laboratory. And a further line of work takes the short view—accounts of project work (Love et al. 2005), for example, or cases of KM programs over a period of months or one or two years. What is needed, we suggest, is an approach that follows a line of explication through different time zones.

3 From Versions to Versioning

It is not the case that all KM work needs to take a totalizing approach, or that every study should involve deep organizational biography, but at times a long time frame can help explain KM "puzzles," outcomes that appear paradoxical, and other unintended consequences, in smaller space-time composites such as teams and task forces. It may be noted that KM in the context of project management is a current focus of research (see Love et al. passim), though few studies in this area have focused on the time and space issues that contribute to the emergence of multiple versions of KM within temporary organizational forms. (A notable exception is the paper by Newell et al. 2000) One reason for this is the lack of a widely accepted methodology that accommodates transitions across different levels of time, and different levels of organization. The sections that follow present a framework for exploring KM in this way, by tracking versions over time, or KM trajectories ("versioning"). The framework draws on a number of powerful concepts from social informatics and social studies of technology: the web of computing, framing, computerization movements and technology trajectories.

4 A Method to Explore KM Trajectories

The "web of computing" is a framework proposed by Kling and Scacchi in 1982 to account for the complex links within and across organizational units that they had observed in fieldwork in a public administration agency. It identifies

four main perspectives any of which might be the starting point for an inquiry into organizational computing. The larger the number of perspectives that are addressed, the richer the results of such an inquiry will be. One perspective is local and immediate and is explored by asking those concerned about their issues and concerns. This may lead to an exploration of how things "got to be how they are," and investigation from a second perspective, the "production lattice" which is a complex of interests, alliances, negotiations, power-plays, whose outcome is a material installation, the "computing" that raises issues and concerns among those who work in it. A further perspective is infrastructure, the (often hidden) purview of a specialist caste such as the IS or IT department in many organizations. A fourth perspective considers the macro level of sectoral and societal rhetorics and ideologies, and concepts of normative technologies, that shape what organizations think they ought to install, and thus shape the material practices of infrastructure by promoting, for example, some standards (and their associated vendors) over others, or some lines of public investment over others.

The second element in our framework is framing, a concept first elaborated in the social sciences by Goffman (1974). Frames, according to Snow (2004), are a useful unit of analysis for practitioners and researchers. They accommodate multiple levels of inquiry, and involve a range of techniques to analyze different factors that affect the dynamics of social movements such as political opportunity, discursive fields, opportunity structures, and narrative identity. These influence the process of frame articulation, or "the connection and coordination of events, experiences and strands of one or more ideologies so that they hang together as a kind of collective packaging device that assembles and collates slices of observed, experienced and/or recorded reality." The concept was adapted in socio-technical research in the 1980s by Orlikowski and Gash (1994), who explain paradoxical outcomes in systems implementation in terms of contested or conflicting technology frames. The concept was further modified by Iacono and Kling (1998) as a "technology action frame," a conceptual alignment and alliance that attracts resources. This version of framing is a signature concept in what they call "computerization movements," large-scale utopian programs of computer investment justified in terms of unquestioned benefits to society—recent examples are e-government, e-learning and e-science. The "computerization movement" is itself an adaptation of the longer established social science concept of social movements, long-term aggregations of actors, interests and resources who are linked by a desire for change and the opportunities to achieve this. (MacAdam et al. (1996), for example, suggests that social movements are characterized by political opportunism, by a framing process that aligns bystanders with the relevant ideology, and mobilization structures that bind associates materially to the cause).

In addition to framing and computerization movements, a third element has informed our methodology, the notion of the technology trajectory. This emerged in the 1980s in research into the social shaping of technology (Fleck,

1993; Williams, 1997), and seeks to explain the design and development of technology pre- and post-implementation. Technological choice is an important feature of this framework: who makes choices? with whom? for whom? what is chosen? Such are, of course, the questions that have informed our title. By establishing a time-line for a set of choices, an analyst can map the intentions and resources that have characterized that series over time, noting the configurations of actors that are involved and the material traces of these in the form of contracts, project templates, correspondence and other documents. In the next section, we present a case study that shows how the concepts of framing, movements, and trajectories may be applied in the study of organizational KM.

5 The Case Study: Project M

The case that is reported here is not untypical of many ICT initiatives in UK municipalities where a local council seeks to embrace the "modernizing" of it's own activities through the utilization of, in this instance mobile, ICTs. The "mobilization" of the rapid response team who are the focus of the case implicates a larger group of players; the council social services IT department; the social services directorate; the council leaders; the national health service (including: hospital trust managers; hospital trust IT departments; general practitioners); the outsource partner; the government (through policy initiatives); the providers of prostheses and other material aids to the housebound, and of course the citizens who are the recipients of the services involved. The council in this case (a medium-size municipality) aims to have "30% of peripatetic staff ... mobile working by 2005" (City Council, 2004). Whilst this broad aim was "at the back of the mind" of some senior staff with an interest in ICT utilization, it was the unforeseen availability of � 200,000 that prompted the decision to introduce mobile ICTs into several areas of work. (This is an example of the opportunism that sometimes consolidates collective framing). Negotiations with the council's outsourcing partner (one of the "big" consulting firms that constitute a monopolistic elite in UK e-government contract work), with whom the council have a ten year partnership agreement for provision of ICT services, led to the identification of both technologies and services that could be introduced.

Discussions within the council identified the areas of council work to which the new ICTs could best be applied. One of the areas identified was a social services rapid response team. The Rapid Response Team is a small unit of six people who normally operate in pairs, that is responsible for community care, working with clients, often at short notice, with a view to providing support services, and equipment, that will allow the client to remain living within the community (as opposed to moving into a hospital, or other form of institutional care facility). In spring 2004 we were invited to undertake a quick and dirty evaluation of a pilot "mobilization" project ("Project M"), which

ended at the beginning of 2005. Team members were issued with notebook and tablet PCs, and given access to a (limited) number of information services, and canvassed for their opinions.

6 KM Versions in Project M: Data Sharing

In Project M, we can see a number of versions of KM at work. The first is KM as knowledge (=data) sharing. In terms of this version, the project was rather ambivalent. Problems were identified with the information services. The client database, on a CD-ROM, was never updated during the pilot, and, as a consequence, this data fairly quickly became of little use. This client file was central to the Team's role, yet because it was provided only once at the start of the pilot study it was redundant within days. Effective and timely communication was paramount to the Rapid Response Team's role, and the fax facility was heavily used to contact NHS care providers. The email service was problematic, and hence little used, primarily because the main form that the Rapid Response Team had to use to record client information (and that formed the basis of inter-agency liaison—the ABC form) would not email, for reasons unknown to the Team members. The issue here was the importance of access to both key information (e.g., client file, stores), as well as to communication services (e.g., email, fax) for mobile working to be feasible.

For the future, the provision of all required forms in a format amenable to electronic completion, sharing, and dissemination was viewed as essential. Similarly, there were certain core services that the Rapid Response Team relied upon, such as stores, which they could not access electronically. The perception of Team members was that their role (mobile or otherwise) relied fundamentally upon access to certain information services, and access to effective (and varied—email and fax) forms of communication. Team members commented that it was not possible to utilize electronic versions of the forms that they had to complete and share with other agencies, noting that it was "a shame that no-one had ever thought about using the forms electronically or delivering them electronically when they were designed . . . which seems crazy."

7 KM Versions in Project M: Mundane Practice Knowledge

Rapid Response Team members fully endorsed the data-sharing version of KM, and they were frustrated that no care had been taken to align it with what we call KM Version Two: mundane practice knowledge (sometimes described as "phronesis" in the KM literature). The staff were disappointed that they had not been consulted before being given the technology, with Team members commenting, for example, "They did it back to front . . . it

would have been nice if they'd asked us what we needed, but instead they imposed it on us. Other forms would have been more useful" and "We weren't consulted at the start as to what we wanted on it ... having the link to stores would have been really useful." Mobile working required that all of these facilities (and in particular, accurate data) be available electronically. A further significant problem with the pilot project was the lack of detailed attention to work practices. The ability to utilize the mobile technologies with the client in situ, was viewed as providing a speedier, and thus enhanced level of service (i.e., enabling more people to be independent in the community). The mobile technology enabled some remote working (i.e., undertaking a task from a "remote" location)—but mobile working much less so (i.e., being able to work without having to return to an office/base). Ultimately, the Rapid Response Team's activities remained unaffected by the introduction of the mobile technology. While access to the mobile technologies meant that the Team members felt able to meet up with their own team, and other team members while out of the office (e.g., a client's home to complete an ABC form), apparently this did not affect significantly the time they spent in/away from the office. Rapid Response Team members spent 50% of their time on Rapid Response duties, and the other 50% "picking up cases" within the office. With Rapid Response Team duties seen as extremely arduous, it meant that team members could foresee only spending limited amounts of time working away from the office anyway—irrespective of technology availability.

Historically, the social work team has worked from a local council office, where cases are picked up and discussed, where expert judgment is exercised, and where much of the coordination of services from different agencies is arranged. Work in the office is imbricated with home visits, where initial assessment takes place and this is subsequently discussed with colleagues back at the office before a plan of action is agreed. Traditionally, one might say, a response is "configured" in the office after a more or less lengthy series of moves and deliberations that reflect the expertise and tacit knowledge of the Team, all qualified professionals. Office meetings are also occasions for exchanging and updating knowledge, alerting colleagues to new developments, and discussing client circumstances "off the record." The mobile initiative will diminish information exchange in the team, as it is intended to shift this part of the process to the client's home, where an individual client and one, or two individual team members can configure what is required on the spot, in a process of in situ consultation and coordination. The configuration that is agreed will be entered on the relevant form, and activate a series of data transactions—the configuration is compiled, the relevant resources are coordinated and a response is composed that indicates what will arrive when. While this may "augment" service for an individual client, as they may be given material support sooner by means of the mobile service than in the traditional service, we suggest that service across a group of clients may be diminished as the Team's shared understanding of the community is diluted.

8 KM Versions in Project M: Process Engineering

From the perspective of the outsourced supplier, KM is interpreted in terms of process management and the criteria used in the evaluation reflect this. After the six month pilot study, an evaluation was undertaken by the outsourced partner, and published (internally only) as a collaborative effort between the council and the outsource service partner. The criteria in the evaluation were restricted (a typical maneuver in the discourse of justification in computerization movements), having been defined by the outsource partner, and evaluation focused upon the Return on Investment. The outcome of this evaluation was the calculation of a time saving of 10.4%, and a net "productivity saving" of 2280 per worker per annum. This evaluation document demonstrated a "successful" pilot project, with a demonstrable financial benefit. The document has been circulated within the council, and now forms an important part of the discussion between the council and the outsource supplier as they endeavor to roll out mobile technologies, and integration of information services across other groups within the council.

It may be noted that "process" is defined very narrowly by the supplier group, in terms of incurring staff costs. So far as the Rapid Response Team were concerned, a key service performance measure was how long it took to get a client the equipment/care required to keep them "independent" (13 days at the time of this study). None of the documentation that sought to assess the pilot study made any reference to such service performance evaluation criteria. Furthermore, the supply team did not attempt to evaluate the qualitative aspects of the project, such as the reported (by the team) improvement in the service to clients. Nor were aspects of the electronic information exchange considered, because whilst in some aspects this was valuable, for example in exchanging data with the National Health Service through faxes, in others it was less so—for example in completing online report forms for sharing with other agencies, and in ordering resources to support clients. The process version of KM used by the supplier appears to be highly selective, a means of both consolidating its own track record, and corroborating the municipality's success as a cost effective manager of services. As we note above, contrary to comments made in the "official" evaluation of the pilot project (City Council. Evaluation Paper, issue 1.0, p. 51), there was a perception among the Team that the technology was indeed "a solution thrown over the wall." This was reinforced by perceived lack of consultation about process, as well as about technology requirements. Lack of training in the early stages meant that technology functions, as well as confidence in use, were not maximized.

9 KM Trajectories

The discrepancy between versions of KM in the case study, far from being a weakness, is a powerful driver for deeper investigation. It would be easy to be cynical about the evaluation exercise undertaken by the suppliers and dismiss

it as partial and self-serving. But it achieved exactly what it was designed to do: namely, it validated the modernization program of the municipality. To explain this, we consider Project M as part of a larger KM Trajectory within the Council. The mobilization of the Rapid Response Team is only one of a suite of applications designed to improve customer service. The "process" KM frame that drives prevailing policy fits well with the technology action frame that drives prevailing policy in the municipality, a response, as we imply above, to a mandatory UK "modernizing government" initiative (UK Cabinet Office, 1999), which has introduced the concept of the "managed citizen" into council thinking. The management of citizens is achieved by means of process modeling that combines representation of services and representation of individual profiles. There is little room in this componential model to apply the collaborative knowledge of grounded professionals (the output of rapid response team consultations in the office), as the process model is premised on cost-efficiency in the satisfaction of profiled "consumer" needs, with little attention to pastoral issues. As we note above, the evaluation did not attempt to include the wider set of actors, specifically the citizen-consumers that are central to e-government ambitions.

According to Gröndlund (2002), e-government emerged in the 1990s. He takes the establishment of the NII in 1993 as a starting point, and traces a trajectory in Europe through the Bangemann report, to the eEurope vision laid out in 2000 and beyond. For Grönlund, a Swede, technology is clearly the driver of e-government. In the UK, as in other Western European jurisdictions, the phenomenon is better explained in terms of a privatization movement that has evolved over almost twenty years, starting with the publication of a UK government report in 1986 paving the way for the privatization of government data, and the establishment of an industry-government nexus that has continued to expand. In addition, an uncompromising deployment of e-commerce and business models and applications has produced a service ecology dedicated to improved efficiency and quality of service: E-government in the UK thus promotes itself as process-oriented and customer-focused (Cabinet Office, 1999).

In this area, as in other areas of information technology acquisition and configuration, choices and decisions are rarely straightforward, but in the UK public sector can often involve the spending of hundreds of thousands, or millions of pounds over the course of the project. This can be considered as a part of the gamble of technology (Hamelink, 1988), where ICT outcomes are uncertain but spending is perceived as necessary (and see Thrift, 2005). Within the UK public sector there is considerable scrutiny and reporting of such practice, often unfavorably (Cross, 2005). Increasingly, public services are faced with tasks involving information service integration, which in essence is concerned with addressing complex technology needs with particular configurations of technologies that reflect, and are reflected in the socially and historically situated nature of the proposed usage (Fleck, 1993).

One way of exploring the KM trajectory in this (and other cases) is in terms of two types of community, "interest" and "practice." First, the ideology (or discourse) that defines an "interest" community will tend to simplify the issues involved in systems implementation, and downplay risk by emphasizing the track record of those who share the rhetoric. This discourse is what the public (or external "bystander" audience, that is, any constituency that needs to be mobilized) will hear. The ecology of communities of interest is partly shaped by social network factors. There are, for example, a few very strong players who have links to most of the networks in the relevant field. This elitism is manifest in the small and oligopolistic market that has developed for e-government service implementation, where repeated contracts are awarded to large corporate developers whose previous contracts have not been delivered either to budget, nor on time or to a performance standard that satisfies agreed criteria. The "winning" discourse among competing rhetorics of interest will draw its strength by association with proven players, often those who can offer "integrated off-the-shelf solutions" in the form of implementation plus training, and economies of scale that undercut the costs of those who become involved in detailed local user requirement analysis.

Second, the discourse of a "practice" community, will, in contrast, focus on the artifact, the difficulties of implementation, on ways of working around infeasible features, and of informal education in these processes for newcomers to a workplace. This process has been well analyzed in studies of "articulation" or "invisible" work (Suchman, 1996). The audience for this discourse is internal, though containment may be leaky, when, for instance, apologetic "officers" share details of the "work-around" with clients.

10 Conclusion

We have presented an approach to understanding KM in organizations that takes "versions" and "trajectories" as units of analysis. From this perspective, knowledge management is not concerned with data, or process, or exploiting knowledge assets; it is the manipulation and control of what gets to count as knowledge. The high level units of analysis may be seen as "blocs" in a political landscape, whose boundaries may merge when interests are reconfigured. The blocs are themselves sites of struggle, and a comprehensive account of KM over time will be recursive. The dynamics of configuration are fundamental importance; KM is tightly coupled with organizational evolution; attempts will be made to sustain dominant versions and attempts will be made to resist them. A KM trajectory will reflect these contests and the material traces of historical struggles (like the ten year old contract in the case study that distorted the implementation of mobiles in Project M) may shape, or even distort, a KM trajectory in unexpected ways.

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Knowledge Processes and Communication Dynamics in Mobile Telework

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Abstract: This chapter links together a practice based perspective on knowledge with the interests of the "virtual working" literature on how the technological mediation of communication in such processes affects the nature of the social relationships that exist between workers. For example this literature suggests that it is more difficult to develop and sustain interpersonal trust than when significant opportunities for face-to-face interaction exist. As the practice based perspective on knowledge emphasizes the impact that interpersonal communication has on knowledge processes this represents an interesting context within which to examine the relationship between communication dynamics and knowledge processes.

Further, the practice based perspective on knowledge regards processes of knowing as being embedded in, sustained through, and developed via the specific (and typically collective) work activities that people carry out. Thus to research and understand the process of knowing that workers are involved in requires an empirical focus on their work activities (Orlikowski 2002). This chapter therefore examines the knowledge processes and communication dynamics of some virtual workers by paying close attention to their work tasks.

The specific type of virtual workers examined are mobile teleworkers, a relatively neglected sub-group in the population of teleworkers/virtual workers. These are workers who require to be spatially mobile to conduct their work, traveling between different sites. The chapter shows how the specific spatial mobility patterns of the workers examined had a significant effect on the communication dynamics of their interactions with co-workers.

1 Introduction

As has been shown in the academic literatures on virtual/dispersed working, it is becoming increasingly common that workers have to collaborate with colleagues who are geographically dispersed. In such work contexts a significant amount of communication and knowledge sharing is mediated by Information and Communication Technologies (ICT's). Research into virtual working has shown how this means of working has significant impacts on both the nature of the social relationships that workers in such contexts develop, as

well as their communication dynamics (DeSanctis & Monge 1999, Jarvenpaa & Leidner 1999, Kraut et al. 1999, Maznevski & Chudoba 2000, Wiesenfeld et al. 1999).

This chapter contributes to this subject area by examining the knowledge processes and communication dynamics of a relatively neglected type of virtual worker: mobile teleworkers. Thus, while the virtual work literature takes account of spatial factors through considering how a lack of face-to-face interaction within virtual teams affects their working, only one such study examines the spatial mobility of such workers in any depth (Orlikowski 2002). Consequently, how workers' patterns of spatial mobility affects the communication dynamics within virtual teams is a topic requiring greater attention.

The analysis developed is framed within a practice-based perspective on knowledge/knowing, largely utilizing Orlikowski's (2002) repertoire of practices, and associated types of activities and forms of knowing. Such a perspective regards people's knowing as being fundamentally embedded in, and reproduced through their day-to-day work activities. Thus, utilizing this framework close attention requires to be paid to the work activities and communication processes of those examined. The empirical data analyzed here is drawn from a small-scale project looking at some human resource management consultants from two small consultancy firms in the UK who can be defined as mobile teleworkers due the amount of travel involved in their work.

Thus, the contribution of this chapter is not only that it applies a practice-based epistemology to a relatively neglected domain of work, but also that it adds a new dimension of analysis, spatial mobility, to understanding the relationship between the ICT mediation of communication processes and the nature of social relations, in virtual work contexts.

The chapter is structured as follows. Firstly, the terms mobile telework and spatial mobility are defined. Following this, the literature review outlines the central characteristics of the practice-based perspective on knowing that is utilized, before reviewing the virtual working literature to reveal the extent to which it neglects the topic of spatial mobility. Sections three and four of the chapter then outline the research and analytical methodology. Following these sections, the empirical data is presented and analyzed, with the analysis being presented in two sections. The first section outlines the nature of the spatial mobility patterns of the consultants, and shows how this affects the temporal rhythm of their communication dynamics. The main body of the analysis then examines the type of practice and knowing utilized in each of the main domains of activity that the consultants worked in.

2 Defining Mobile Telework

A number of analysts suggest that the extensive mobility of goods, information, money and ideas represents one of the key features of the contemporary globalized world (Adams 1999, Hardill & Green 2003, Urry

2000). In relation to the spatial mobility of workers, empirical evidence reinforces such arguments by suggesting both that the last thirty years have witnessed a significant growth in the proportion of workers for whom spatial mobility is an important part of their work (Felstead et al. 2003, Felstead et al. 2005), and that a significant proportion of the contemporary teleworking population is spatially mobile (Bates & Huws 2002, ECaTT 1999). Before proceeding any further it is necessary to define the terms spatial mobility and mobile telework.

Spatial mobility refers to the pattern of physical movements between locations that workers undertake in the conduct of their work, with the degree of spatial mobility involved in work varying enormously. For example, production workers in factories have relatively low levels of spatial mobility, as they work primarily at one particular site. In contrast, workers that have more significant levels of spatial mobility, where a significant amount of travel between different locations is required, include consultants, drivers and delivery staff (such as post workers), and traveling sales/service staff who require to visit client's sites to sell, service or repair equipment.

In defining virtual work a useful starting point is the virtual working literature. For example, Cramton defines virtual working as involving,

"groups of people with a common purpose who carry out interdependent tasks across locations and time, using technology to communicate more than...face-to-face meetings" (2001, p. 346).

This definition therefore allows for virtual workers to be spatially mobile, but as will be shown later, this is a neglected theme of analysis in academic studies of virtual working.

Another limitation of such a definition is that it is relatively generic, covering a wide diversity of occupations/jobs. In relation to spatial mobility for example, such a definition encompasses people with wide ranging and diverse patterns of mobility. Thus, a useful addition to such a definition is a more fine-grained conceptualization of mobile telework, which takes account of, and differentiates between the different types and patterns of spatial mobility that mobile workers undertake. One way in which distinctions can be made is through taking account of the specific locations that work is carried out from. To achieve this a three-dimensional framework based on the location of where work is carried out has been developed (see Fig. 1). This framework has three extreme poles, and scope for (almost) infinite variance in between (see Fig. 1). The three poles in this framework represent:

1. Pure, mobile workers, who have no fixed location that they work from at all (either home or office).
2. Pure organizational workers, who work full time on their employer's premises.
3. Pure home-based teleworkers, who work full time from home.

Pure Mobile Worker

CONSULTANT

**Pure Workplace
(office, factory)
based Worker**

**Pure
Home-based
Worker**
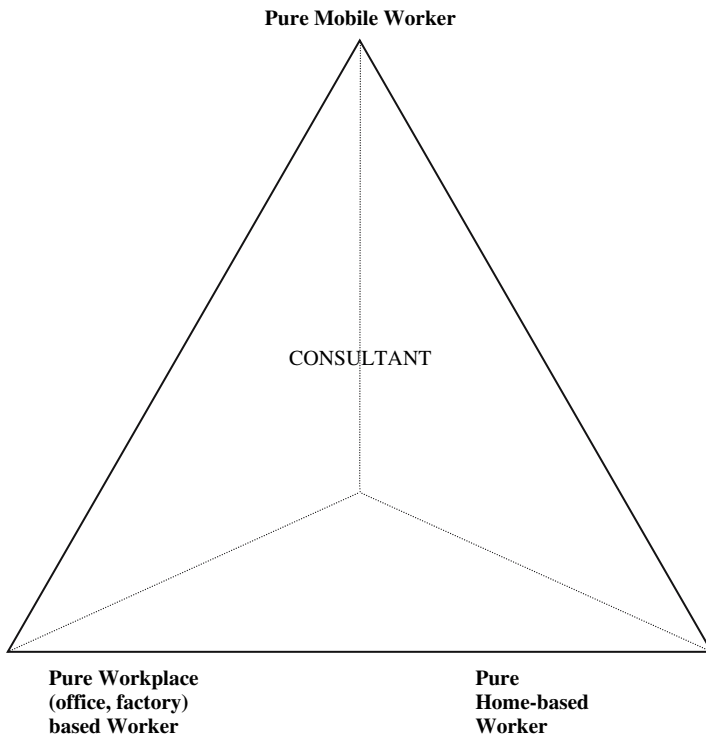
Fig. 1. Three Dimensional Conceptualization of Occupational Types Based on Location of Work

To illustrate the framework the case of management academics can be considered, concentrating specifically on those who are involved in research and publishing. Such academics can be placed somewhere in the middle of the diagram, as not only do they typically do some work at their employer's location (for example teaching, meeting and supervising students, carrying out administrative tasks), and occasionally work from home (perhaps to do writing, which is where I am writing this chapter), but they also require to be spatially mobile, traveling to and working at a range of other locations (for example visiting research sites, visiting the work location of research collaborators, attending conferences ....). The specific location of any particular management academic on the framework will vary, dependent upon their particular balance of these activities.

3 Literature Review

As outlined by various authors, there are two dominant epistemologies in the academic literature on knowledge management, which Cook & Brown (1999) refer to as epistemologies of possession and practice (see also Blackler

1995, Empson 2001). This chapter utilizes a practice-based epistemology, as it is sensitive to both the way in which the tacit and explicit components of knowledge are inseparable and mutually constitutive, and how the knowledge people develop, apply and utilize in organizations is inextricably inter-twined with the work tasks they carry out.

From this perspective, in contrast to the way knowledge is portrayed by epistemologies of possession as a stable and discrete entity, knowing is regarded as being embedded in, sustained through, and developed via the specific (typically collective) work activities that people carry out. Orlikowski (2002) suggests that knowing is, "*an ongoing social accomplishment, constituted and reconstituted as actors engage the world in practice*" (p. 249). Thus people sustain, develop, transform and demonstrate their knowledgeability in their everyday activity. Fundamentally, knowing refers to the capacity to act in particular circumstances. For example, I can demonstrate, develop and sustain my "knowing" as a management academic through successfully carrying out tasks such as writing book chapters and journal articles, presenting papers at conferences, and teaching to classes of students. Those utilizing such a perspective thus pay close attention to people's work activities.

The typically collective nature of working means that how a worker develops and sustains their knowing is mediated via their interactions and communication with co-workers, and is thus typically a collective, rather than individual social accomplishment. Most empirically based analyses which have utilized a practice-based perspective have concentrated on collocated work (an exception being Sole & Edmondson, 2002) Thus, an interesting context in which to apply a practice-based epistemology is in a dispersed, or virtual work context, where co-workers are geographically dispersed rather than co-located, and where work interactions and communication processes are largely mediated via the use of ICT's. As a number of practice-based studies have emphasized the role of face-to-face communication in inter-community knowledge sharing, how the ICT mediation of communication in this context affects such processes is thus of interest (Bechky 2003, Gherardi & Nicolini 2002).

Another reason why this represents an interesting context in which to apply a practice-based perspective is that the virtual working literature suggests that the mediation of communication and interactions via ICT's significantly affects the way people develop and sustain social relations. Such a conclusion becomes apparent from reviewing the academic literature on virtual and dispersed working. To achieve this, a search of the electronic database BIDS (Bath Information Data Services) was conducted. This search covered the period between 1999 and 2005, identified only journal articles published in English, and only the titles of the articles were searched for relevant key terms. The three specific search terms used to identify relevant literature were "virtual work," "dispersed work" and "distributed work." This search produced a total of 29 articles (see Appendix 1).

Of the 29 articles that were identified, six were purely theoretical and 23 contained some original empirical material. The importance of the relationship between inter-personal social relations and the ICT mediation of communication processes is reflected in the fact that seven of the 23 empirical papers consider how the frequency of face-to-face interactions affects the dynamics of such work arrangements (Fiol & O'Connor 2005, Grabowski & Roberts 1999, Kirkman et al. 2004, Maznevski & Chudoba 2000, Orlikowski 2002, Sole & Edmondson 2002, Wiesenfeld et al. 1999). Further, another six of these papers examine how social relations, and the development of trust are affected by the ICT mediation of interactions (Cramton 2001, DeSanctis & Monge 1999, Hinds & Bailey 2003, Jarvenpaa & Leidner 1999, MontoyaWeiss et al. 2001, Pantelli & Duncan 2004).

However, a striking, and to some extent surprising conclusion from the literature review was that apart from considering the frequency of face-to-face meetings, the topic of spatial mobility more generally was neglected. Thus, when the papers were analyzed to see whether either the theme of spatial mobility was examined, or whether they contained empirical data on mobile teleworkers, only one of the 29 papers had such a focus (Orlikowski 2002). In all the other papers, mobile teleworkers, and the theme of spatial mobility were not explicitly examined. Thus, with the exception of Orlikowski (2002), a curiously static perspective on work is taken by this literature. The implicit assumption is that the work of those participating in dispersed or virtual work activities involves little spatial mobility for individual workers.

In conclusion, this chapter adds in an extra dimension, spatial mobility, to the analysis undertaken by the virtual working literature which considers how the ICT mediation of communication and work practices affects both information and knowledge sharing processes, as well as inter-personal social relations. As a practice-based perspective on knowing is utilized this is done through paying close attention to the work practices and communication behaviors of the mobile workers examined.

4 Research Methodology

The empirical data presented in the paper is drawn from a small scale, exploratory, case study based investigation of a number of different occupations that can be categorized as mobile telework. However, the central focus of the study was on two contrasting jobs: consultants and service engineers. Thus, of the 29 interviews that were conducted, 24 of them were from these two occupational groups. Of these 24, 18 were with consultants drawn from two separate organizations and six were with service engineers, drawn from only one organization. However, the specific focus in this chapter is on the consultants alone, the occupational group for which most empirical data exists.

The two consultancy companies from which the interviewees were drawn were small UK based human resource management consultancies, with one employing 12 consultants, and the other employing 30. These case study organizations are thus not intended to be representative of all types of consultancy companies. The objective of the research was to use a case study methodology to provide a rich, qualitative insight into the lived experience, work patterns, communication dynamics and general work context of the consultants/mobile teleworkers interviewed (Hartley 2004). The research undertaken and the analysis presented is indicative and illustrative, rather than being generally representative. However, while it is not possible to generalize from a small number of cases to a larger population, the ability of qualitative case study research to examine, in depth, the causal relations between events/processes, it is possible to use case study research to develop generalizible propositions (Easton 2000, Yin 1989). Thus one objective in the chapter is to develop such propositions and point toward areas that may provide fruitful ideas, issues and themes for further analysis.

The primary data collection method utilized in the study was semi-structured interviews. In the company with 12 consultants, seven were interviewed, and in the company with 30, eleven were interviewed. In both organizations a representative cross section of consulting staff were interviewed, including managing directors, consultants of varying degrees of seniority, as well as new recruits and trainees.

5 Analytical Methodology

The methodology utilized to analyze the fieldwork data collected was template analysis (King 2004). As the research undertaken was a small scale, exploratory study of a neglected group of workers, the analytical methodology was inductive rather than deductive. A deductive approach was initially used to generate themes to be explored in the interviews, with them being taken from the virtual working literature. For example some of the topics explored in the interviews included how people's sense of identity was shaped by the nature of their work, and how trust and social relations with colleagues were sustained when opportunities for face-to-face interaction were limited.

However, the detailed template analysis of the interview data collected was developed more inductively. The initial template used was based on the exploratory interview themes, but this was developed and substantially refined through the repeated reading and analysis of the interview transcripts. Through this process, a number of specific concepts and categories were developed, with these being then linked to specific concepts in the existing virtual working literature.

This process of analysis suggested that one of the key factors which distinguished the mobile teleworkers examined from the virtual workers examined in the mainstream academic literature, in terms of the

communication behaviors they undertook and the knowledge processes they were involved in, was how the travel they required to undertake, the technologies they had available to them and the work tasks they were involved in significantly affected the extent to which, and way in which they were able to communicate with relevant colleagues. Finally, as will be seen, the concepts developed in two specific papers proved particularly useful in theoretically framing the analysis (Maznevski & Chudoba 2000, Orlikowski 2002).

5.1 Analysis: Patterns of Spatial Mobility and Temporal Communication Rhythms

Due to the heterogeneity of mobile teleworking it is useful to clarify the spatial mobility patterns of the consultants examined before the main empirical evidence is presented and analyzed. This section utilizes Maznevski & Chudoba's (2000) work to show broadly how the spatial mobility patterns of the consultants impacted on the temporal rhythm of their communication dynamics. One of the first questions the consultants were asked was to describe their typical working week, in terms of location. The following quotations give a good sense of the general pattern.

"*I'm probably out about on average 1.5 to 2 days a week and in the office the remainder of the time with a bit of working from home.*"
And

"*I'm away for a couple of days, three days, four days at a time. Certainly Fridays typically I'm in the office and one or two of the other days I would be in the office or working from home, typically.*"
A more detail quotation, which also gives a sense of the physical distances traveled, is,

"*OK let me describe this week. Actually it's been mainly business development this week, so for example, Monday...I was in the office.... On Tuesday I spent the day in Plymouth, I drove all the way down to Plymouth [from near Manchester]*[1]*, met 4 people within [client 2]. That was all business development..... And drove all the way back that night, got home very late. Wednesday, yesterday, drove to Leeds*[2] *and had an initial client meeting with [client 3] because we are running a team-building day with their IT managers in May. And today [in the office] I am designing a presentation that we're giving tomorrow in Gatwick. So tonight I'm going down to Gatwick*[3]*. I shall be leaving here about 7 this evening, get into Gatwick God knows when, stay in a Travelodge® overnight, and tomorrow morning I'm giving a presentation to [client 4], at 1030. And I shall leave there at 12 o'clock on Friday and drive all the way back home again! So kind of on the road work. A lot of travelling up and down motorways. I know motorways inside out.*"

This data suggests that the consultants can be placed quite close to the center of the work location framework (see Fig. 1) as they have an office base

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[1] A distance of about 280 miles (445 km)
[2] The distance from Manchester to Leeds is approximately 45 miles (70 km)
[3] The distance from Manchester to Gatwick is approximately 230 miles (350 km)

which they use on a regular basis, they require to be spatially mobile for much of their time, visiting clients and working at their sites, and finally, they also occasionally work from home.

Another important dimension to their weekly working patterns was that the consultants from both companies indicated the importance with which they regarded having a weekly opportunity to interact with colleagues on a face-to-face basis, which most frequently occurred on a Friday. In neither organization were Fridays formally designated as days when consultants had to be in the office, but in both organizations such a practice had virtually become an institutionalized, but informal and uncodified part of the working culture. Thus two consultants noted that,

"we tend to be in on Friday so that's a least one day a week you get to see people."

and,

"I will always make sure that I'm here [in the office] *once a week. Especially on a Friday when everyone's around."*

Overall, there was a weekly rhythm to the work patterns and mobility of the consultants, as, in general they typically spent the start and the end of each week either in the office or working from home, and the middle of each week out visiting clients, with the amount of time spent visiting clients sites typically vary from between two to four days per week. Understanding their physical, spatial movements in terms of a temporal rhythm links with Maznevski & Chudoba's (2000) analysis of the communication dynamics of virtual teams. They argue that a useful way to understand the temporal dynamics of communication within virtual teams is to consider these interactions as being made up of a series of discrete "communication incidents." Looking at the pattern of such incidents over time builds up a picture of the temporal rhythm of communication dynamics.

For the consultants, the combined effect of their patterns of spatial mobility together with the travel and work activities they undertook had a discernible impact on the temporal rhythm of their communication processes, helping to create a regular, weekly rhythm, which had two typically distinct phases. Firstly, as will be seen in more detail with the empirical data presented in the following section, while traveling, or working at client sites, communication with work colleagues was typically frequent, regular, and technology mediated, either being done via e-mail or mobile phone. Secondly this pattern was usually punctuated by weekly face-to-face meetings in the office, which were regarded as vitally important by the consultants in helping to sustain their ongoing social relations with colleagues.

5.2 Analysis: Work Patterns and Communication Dynamics

The analysis developed here is based on the knowing/practice framework developed by Orlikoswki (2002). The key advantage of this framework is that it utilizes and develops the practice-based epistemology on knowing, showing the

close linkages between the generic practices, specific activities, and knowing that is re/constituted through these practices. In Orlikowski's (2002) paper, the framework developed is based on the detailed analysis of a single case study organization, KAPPA, a globally dispersed software company. The five generic practices and their associated activities and knowing are summarized in Table 1. Of these practices/knowing, two relate to the general work context (knowing the organization and knowing the players) while the other three relate specifically to the work tasks of the software developers studied (knowing how to coordinate, knowing how to develop capabilities and knowing how to innovate).

Table 1. Orlikowski's (2002) Repertoire of Practices, Activities and Knowing (adapted from Table 2, p. 257)

Practice	Details of Practice	Activities Comprising the Practice	Knowing Constituted in the Practice
Sharing Identity	Developing a (shared) sense identity as being a part of Kappa's (distinctive) community and values.	• Common training and induction. • Identifying with the organization	Knowing the organization
Interacting face-to-face	Developing a knowledge of relevant people through face-to-face interaction.	• Sharing information • Developing trust, credibility • Building social networks	Knowing the players in the game
Aligning Effort	Coordinating work efforts with (dispersed) colleagues.	• Using common models and metrics	Knowing how to coordinate across space and time
Learning by doing	Developing relevant, personal capabilities on an ongoing basis.	• Investing in individual development • Mentoring other employees	Knowing how to develop capabilities
Supporting Participation	Ensuring participation of widest possible constituency of relevant actors in relevant decisions/processes.	• Involving participants in project decisions • Initiating and supporting overseas assignments.	Knowing how to innovate

While Orlikowski structured her analysis around these five practices, the analysis here is structured differently. Fundamentally, the analysis here is organized around the domains/locations of activity that the consultants were involved in, with the range of practices being used in each domain being examined separately. The primary intention of this structure is to illustrate how the communication dynamics and work practices undertaken are shaped by the spatial mobility patterns of the consultants. An overview of the analysis and the generic domains/locations of activity is presented in Table 2.

Table 2. Work Locations and Associated work/communication practices and Knowing

Work Location/Domain of Activity	Work/communication Practices	Knowing
	Working with client staff (making presentation, implementing results)	• Knowing how to provide consultancy services to clients
Client's Offices	Electronically mediated communication with colleagues.	• Knowing the players • Knowing how to coordinate across space and time • Knowing how to provide consultancy services
Travel	Communicating with staff face-to-face, or via mobile phone.	• Knowing the players. • Knowing how to coordinate across space and time.
Home	Electronic communication via email, phone and mobile phone	• Knowing the players. • Knowing how to coordinate across space and time.
	Writing reports/documentation	• Knowing how to provide consultancy services
Employer's Offices	Formal project meetings	• Knowing how to provide consultancy services. • Knowing how to coordinate across time and space. • Knowing the organization.
	Informal meetings/interactions with colleagues	• Knowing the players • Knowing the organization
	Writing Reports/documentation	• Knowing how to provide consultancy services.

Finally, before the analysis is presented a number of brief comments are necessary. Firstly, due to the differences in the work tasks between the consultants examined here and Orlikowski's software developers, the term "knowing how to innovate" has been replaced by "knowing how to provide consultancy services." Secondly, "learning by doing" and "knowing how to develop capabilities" were not topics examined in research, and are thus not included in the analysis presented here. Finally, as will be seen, a range of practices were typically carried out at each location, with the types of knowing constituted in these practices being, typically multiple.

Client Site: Work and Communication Activities

As outlined in Table 2, the work done by the consultants while at their client's sites consists of two generic types of practice: working with clients and communicating with colleagues. However there is a close interrelationship between the two as working at client sites significantly affected and inhibited their ability to communicate with work colleagues.

Working and meeting with clients involved a number of specific activities such as pitching for work and listening to a client's needs, presenting their analysis to clients with regard to what support/services can be provided, or implementing and providing their services (for example through running training workshops). One common feature of all these activities is that they are time intensive, requiring extended face-to-face interactions with clients and typically preclude the consultants from participating in other communication activities (such as taking or making mobile phone calls). Thus, while working at client sites opportunities to undertake the second generic type of activity, communicate with colleagues, was typically restricted to lunch times, breaks, and evenings. For example two interviewees said,

"*whenever I'm out of the office I try and phone in at least once a day, generally at lunchtime, if I'm on a training course.*"

And,

"*maybe like at lunchtime, if John was ever working from home or out, he would ring me at lunchtime and say "hi, how are you, how was your morning.*"

However, while opportunities to undertake such communication were constrained the consultants also revealed that despite this, they made significant efforts to communicate with their work colleagues. For this, mobile phones were invaluably important as they provided a way of contacting people almost irrespective of location (as long as there was network connectivity). Thus, when out of the office, one of the main characteristics of the consultants" communication dynamics was the frequent use of their mobile phones. For example, two interviewees said the following,

"*It is essential that you make a proactive effort to manage contact with colleagues.... I maintain contacts with regular telephone calls to colleagues.*"

And,

"*Wherever we are I will ring John* [project manager] *or he will ring me, even just to say "how was your day, what are you up to," um, and then he will say what he has been doing. Yes, everyday I talk to John just to keep in touch.*"

While much of this communication was for formal, work related purposes, there was also evidence that one aspect of it was more informal, motivated by the explicit objective to help sustain inter-personal relations with colleagues. Thus the following comments were made by interviewees,

"*It's two-way, formal and informal. I mean silly things like if I'm not in for a while, one way I find of trying to remind people I'm still here is to send them jokes provided I haven't received them from them in the first place.*"

And,

"*...it can be quite a lonely job and sometimes you feel in need of a bit of contact with colleagues and sometimes you can sense that colleagues value a little bit of contact so you need to give that. I mean there are some calls which on the face of it might appear, um, like chit chat but are actually quite important because it gives you an opportunity to sound out how other people are thinking, how other people are feeling and stay in touch.*"

And,

"*if I am working out of the office all week, I will just ring in and speak to people have an informal chat. Just to find out what the latest gossip is and everything.*"

As illustrated in Table 2, such communication practices involve not only task focussed knowing, such as how to coordinate across space and time, but also more informal, contextual knowing, what Orlikowski labeled "knowing the players." The importance of this is crucial, as such communication provides the consultants with a means of attempting to sustain social relations with colleagues in a context where opportunities for face-to-face communication are limited. Such communication patterns demonstrate the type of communication behaviors (timely and predictable) which Jarvenpaa & Leidner (1999) suggest can help sustain interpersonal trust in virtual work contexts.

Travel: Communication and Work Activities

Traveling represents the most constrained domain of work activity, as the only real work activity that can be conducted some of the time is communicating with others, with this typically being limited to mobile phone conversations which are subject to the vagaries of network coverage. While large amounts of driving was regarded as tiring and stressful, the consultants sometimes felt that this could be made into more useful time through the opportunities it gave to telephone people. Such calls were also a mixture of formal work related calls to clients, and more social calls to colleagues. For example, the following comments were made by various interviewees,

"if you're driving for four hours, two hours to Oxford, two hours from Oxford, you have a choice, you can sit and listen to the radio, you can use it to unwind in terms of stress although that"s quite difficult on the M4 when there's road works. . . . Or you can actually use that time to make "phone calls, you can have a mobile "phone set up in your car which is kind of a hands free."

And,

"So you basically, for a two hour meeting, the whole day is gone. And then that's when the old phone comes in handy because you can get on the phone to clients and contacts and do things on the go."

And,

"I've phoned up people on the other side of the business just to have a chat. I've been driving home on a Friday afternoon from Bristol. 'Who can I call up? I know, I'll phone Jerome.' Have a bit of a laugh, a natter. I don't do that probably yet enough. And also it's alright for me, I'm in the car, it's Friday afternoon, I can phone up for a natter."

Without (hands free) mobile phones, such communication would be impossible, and no work activities would be possible while traveling to clients. Thus, to some extent the development of these technologies have facilitated and made possible this type of work activity. However, the technology underpinning these communications is still far from perfect. For example, it is still relatively common that mobile phone conversations conducted while traveling are disrupted by the unreliability of mobile phone network coverage. Thus one interviewee said,

". . . likewise when you are on the train and your mobile is constantly cutting out, even if you are trying to use the phone discretely without disturbing anyone else on the train, um, if you are constantly having to repeat the same conversation that can be hugely frustrating."

Home: Communication and Work Activities

As illustrated in Table 2, there are two generic type of practice that the consultants typically undertake: writing reports and documentation and technology mediated communication. However, the primary objective articulated by the consultants for working at home was to prepare project documentation such as reports and presentations, as the home environment was argued to be significantly more conducive to the completion of such tasks than the office. This is summarized in the following quotations,

"If I need to do some 'head-down' work, for example, to write a complicated report, to prepare a presentation, to work on the strategic direction of the business. . . . . . .When I've really really got to concentrate then I'll work from home."

And,

"it's great because there's no distractions at all. There's only the cat."

And,

"*without a doubt I am way more productive when I am at home than when I am in an office. That's another advantage I haven't touched upon. I can do five times as much in a day in my office at home than I can in an Oxford office when I've got people to talk to, to distract me.*"

"the days I'm working at home you get a lot more peace and quiet. You can get a lot more done in an eight hour day than you can in an eight hour day here in the office"

"*you actually get quite a lot of work done at home if you need to do something like report writing or something which needs quite a lot of quiet*"

Employer's Office: Work and Communication Activities

As outlined earlier, most consultants in both organizations examined made significant efforts to be in the office on a weekly basis, particularly on a Friday. As illustrated in Table 2, on such days three generic types of practice were typically undertaken including formal project meetings, informal social interactions, and to some extent writing reports/documentation. As Fridays were typically the only day in the week that the consultants had the chance to interact face-to-face with most of their colleagues these days were normally busy, if not frenetic. The nature of the practices undertaken, and the general mood on these days is captured in the following quotations.

"*you need to squeeze a lot into one day in terms of catching up with people. Talking about the different projects you're working on. Just catching up with them about work and life in general because the thing you would normally do across the week in terms of socializing with your colleagues, you have to squeeze all that into one day.*"

And,

"*….when you are in, you do a lot of gossiping, catching up, if you can, if you're not busy and that's what you generally do… if you are in the office once a week, you probably do spend about an hour of that chattering about anything basically. You might call that time-wasting but it's important, I think, to keep that contact going with other people.*"

Finally,

"*…So coming in on a Friday I look forward to it, quite a buzz in the office on Friday because its just meetings all day.*"

Thus while an important aspect of going into the office on Fridays was for formal, work related activities, such as having project meetings, or writing documentation, an equally important outcome and objective of such practices was that they provided the consultants opportunities to undertake more informal interactions with the objective of sustaining ongoing social relations with colleagues. This fits with the conclusions of some of the virtual working literature which suggests that while trust based social relations can be sustained, to some extent by technology mediated communications alone, occasional face-to-face interactions can play a fundamentally important role in strengthening social relations among workers who predominantly work at a

distance from each other (Maznevski & Chudoba 2000, Nandhakumar 1999). This was also the conclusion of Orlikowski (2002). For Orlikowski, the function and utility of face-to-face interactions for dispersed workers is threefold. Firstly, they provide a way for people to sustain trust and demonstrate commitment within pre-existing social relationships. Secondly, the richness of face-to-face communication allows for complex information and knowledge to be shared. Thirdly, they allow the development of social relations with new colleagues, and people with whom there is no pre-existing social relationship.

6 Conclusion

Using a practice-based perspective the chapter has illustrated how the knowing of the consultants examined is embedded in, developed via, and sustained through the various work activities they carry out. Thus, rather than talk of knowledge, as if it is a discrete entity that the consultants possess, and which can be passed on and shared with others in the same way that discrete pieces of information can be transferred, the chapter has deliberately used the term knowing. Such a nomenclature emphasizes how people communicate, demonstrate, sustain and reinvigorate their knowing through competently carrying out their day-to-day work activities.

In doing this, explicit use was made of Orlikowski's (2002) analytical framework, which was developed to analyze a similar type of work to that examined here: virtual working, where work colleagues are typically geographically dispersed and require to make extensive use of ICT's to communicate. However, the way Orlikowski's framework was applied illustrated and emphasized the relationship between the character of the different physical contexts the consultants worked in, and type of work activities that they carried out in these domains.

One of the most important conclusions and insights from the chapter is the crucial effect (both constraining and enabling) that the nature of the work context itself can have on the type of activities that can be carried out within it. For example, traveling, and in particular driving, was shown to limit the type of work activities the consultants could practically do to (electronically) communicating with others via mobile phones. Such opportunities were also shown to be constrained by the limits of mobile phone network coverage. Secondly, such a constraining/enabling effect was also visible in the home context. This domain was typically regarded as a quiet sanctuary, highly conducive to work requiring extended amounts of concentration, such as writing reports. Finally, office based work contexts seemed to have a paradoxical character, as while they provide a context rich in opportunities for face-to-face interaction among colleagues, this makes the completion of tasks requiring high levels of concentration difficult, due to the likelihood of continuous distractions. Thus, while the knowing of the consultants is constituted and reconstituted through the work activities they

carry out, the type of activity, and hence types of knowing that can be utilized at any point in time are shaped by the character of physical work context.

However, this is not to suggest that context has a determining influence, and that work contexts are immutable. As Brown & O'Hara (2003) show, physical work contexts are amenable to control and manipulation, and can be configured in particular ways to facilitate certain type of work. For example the simple act of pushing desks together, putting temporary partitions in place etc can significantly change the character of a work context.

In broad terms the chapter makes three contributions to knowledge. Firstly, it examines how patters of spatial mobility, a relatively neglected theme of analysis in contemporary studies of work, affect the knowing and communication activities of the consultants. Secondly, it applies a practice-based perspective to a relatively neglected work context: virtual working (exceptions are Orlikowski 2002 and Sole & Edmondson 2002). Finally, in relation to the virtual working literature, it has added the dimension of spatial mobility to the debate on how the technological mediation of work and communication activities affects the ability of workers to develop and sustain effective working relations with colleagues.

To conclude, the chapter suggests a number of topics for further exploration that flow from the insights developed here. Firstly, the initial section of the analysis pointed toward a relationship between people's patterns of spatial mobility and the temporal rhythms of their communication dynamics. This is an issue worthy of further investigation, where the impacts of different patterns of spatial mobility have on communication dynamics can be investigated. A second issue which is a potentially fruitful topic for further investigation is the role played by mobile technologies in facilitating and constraining the communication and work activities of spatially mobile workers. For example, the data presented here suggests that mobile phones, in particular, are crucially important for such workers. Finally, the chapter illustrated the important role played by the character of the various work contexts the consultants operate in, and how this shaped the type of task that could be carried out within them. This therefore suggests that the effect the nature of people's work contexts has on their work, knowing, and communication activities is a topic that would benefit from further investigation and analysis.

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Appendix 1

Academic papers on Virtual/dispersed/distributed working (1999–2004). From BIDS.

Fiol & O'Connor (2005)

Furst et al. (2004)
KasperFuehrer & Ashkanasy (2003–04)
Kirkman et al. (2004)
Panteli & Duncan (2004)
Piccoli et al. (2004)

Ahuja et al. (2003)
Clases et al. (2003)
Harris & Ogbonna (2003)
Hinds & Bailey (2003)
Pyoria (2003)

Orlikowski (2002)
Sole & Edmondson (2002)
Becker (2001)

Cunha & daCunha (2001)
Cramton (2001)
Medcof (2001)
MontoyaWeiss et al. (2001)

Hughes et al. (2000)
Maznevski & Chudoba (2000)
Sawhney & Pradelli (2000)

Ahuja & Carley (1999)
DeSanctis & Monge (1999)
Grabowski & Roberts (1999)
Jarvenpaa & Leidner (1999)
Kraut et al. (1999)
Kurland & Egan (1999)
Staples et al. (1999)
Wiesenfeld et al. (1999)

The Critical Role of the Librarian/Information Officer as Boundary Spanner Across Cultures:
Humans as Essential Components in Global Digital Libraries

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Abstract: As libraries become increasingly based on digital storage and access technologies, knowledge management approaches seem particularly useful. Most knowledge management systems emphasize the role of information and communications technologies, and the question arises about the role of librarians in these systems. This paper posits that if globally digital libraries are to realize their potential for providing access to the widest feasible range of knowledge, librarians and information officers need to fulfill a challenging and critical role as boundary spanners across cultures. This paper is based on evidence that knowledge is culturally derived, acquired, and applied, and that learning—the acquisition of new knowledge—is enabled by skills that are culturally dependent. This aspect of knowledge suggests that the tacit dimension of knowledge and learning may require humans to aid in spanning the boundaries across different knowledge domains and different cultures. This paper has three components. First, it reviews what is becoming known about learning and how this relates to knowledge creation and knowledge transfer. Second, it reviews a boundary spanning model proposed by Carlile, comprised of three levels—syntactic, semantic, and pragmatic—and applies this model to learning across cultures. Finally, the paper discusses the implications of such a model of knowledge for libraries that seek to serve as global resources for multiple cultures. For digital libraries, new skills and approaches may be required for the pragmatic category.

1 Introduction

Since the 1990s, knowledge management has become an area of research and a popular topic in the management practitioner literature (Ponzi & Koenig, 2002; Koenig, 2005). Over this same period, the relentless pace of Moore's Law

has meant that the cost of digitizing and storing data has dropped by several orders of magnitude, leading to the concept of digital libraries that can enable anyone who has access to the Internet and who has a web browser to reach into a collection of objects that represent the world's knowledge. Knowledge produced and stored in one place can be accessed from any other place. Individuals or organizations can learn through the convenience of electronic access to collected knowledge stored in digital formats. It is this vision of a digital library linked with a global network of similar libraries that provides the motivation for this paper.

This vision is an appealing one and would appear to be feasible with current technology. The value of such a network of digital resources for global economic and intellectual development is apparent to all who view such globalization as beneficial. For this vision of world-wide access to information to become a reality, knowledge must be created and knowledge objects stored in formats and architectures accessible to everyone.

Global organizations have attempted to realize this vision. Such organizations want to have information within the organization accessible to those who need it, when they need it. To achieve this goal, many have designed and implemented Knowledge Management Systems (KMSs). For a knowledge-centric organization—an organization in which knowledge is the primary asset for creating and adding value—an investment in a KMS is seen as a competitive necessity, if not a basis for competitive advantage (Davenport & Prusak, 1998). Most approaches to the design of a KMS follow a model similar to that in Fig. 1, a basic process model in which knowledge is created, stored/retrieved, transferred, and applied (Alavi & Leidner, 2001). The goal of a KMS is to support each step in this process—that is, to support the creation, storage, transfer, and application of knowledge. The implication is that KMSs using computer-based systems will improve the effectiveness and efficiency of knowledge storage and transfer, two key steps in the process.

Some have criticized this model, more precisely, the majority of the KMSs that have been implemented based on this model, as being too "North American centric," and as not recognizing or valuing the knowledge management approaches of non-western cultures (Nonaka, & Takeuchi, 1995; von Krogh, Ichijo, & Nonaka, 2000). A recent review of published reports on KMSs concluded that such criticisms have merit (Mason, 2003). Existing KMSs, including those that serve a global organization, focus on creating a

Fig. 1. Process Model for Knowledge Management

strong organizational culture in order to be successful. The designs are not sensitive to any ethnic and cultural differences that may exist among their users. The implied assumption is that the benefits of a strong organizational culture sufficiently outweigh the costs of attempts to accommodate the distinct learning approaches that may be represented by the diverse cultural constituencies in a global enterprise.

The goals of a digital library typically will be broader than the goals of a KMS designed for a single global organization. A library that anticipates being a node in a global network can expect to have a wider constituency than a KMS designed for a single organization. In contrast to the digital library for a specific organization, such a library has less opportunity to create an overlay of a single organizational culture that would dominate the multiple national and ethnic cultures comprising the backgrounds of the final users of the library and library network. Consequently, cultural issues may be even more important for digital libraries than for organizational KMSs.

This paper is based on the evidence that knowledge is culturally derived, acquired, and applied, and that learning—the acquisition of new knowledge—is enabled by skills that are culturally dependent. These cultural bases for knowledge creation and absorption mean that knowledge management systems, especially those supporting digital libraries, must take culture into consideration in their design and implementation if they are to realize their potential for providing access to the widest range of knowledge.

The paper proposes a conceptual framework for thinking about knowledge management in the context of digital libraries that may serve multiple cultures. The framework is grounded in the context of boundary spanning, a concept that acknowledges the need for mechanisms for communication across the boundaries between domains of knowledge and experience.

2 Culture and Learning

Culture generally is taken to be the shared beliefs, customs, norms, behavior, and practices of a nation or ethnic group or groups. Culture is both individual—it is manifested as individual traits that are learned—and collective—it emerges over time from the shaping of social behavior and practices through the combined activities of a nation or group.

The cultural influences on early childhood profoundly affect the individual traits. Among these are approaches to perceiving and making sense of the world, traits that strongly affect how the individual learns. Recent studies on the development of the brain reveal more about how this happens. At the time of birth, a baby has about the same number of neurons (brain cells) in its brain as an adult—about 100 billion. However, there are only about 50 trillion synapses, or connections among these neurons. In the first three years, the number of synapses grows twenty-fold, to one quadrillion. Because synapses are potential learning pathways, this explosion of connectivity within

the brain equips the child to learn from the range of new stimuli which the child experiences in these early years. The brain as "sponge" metaphor has been used: watching a child who is just beginning to pay attention to his surroundings is like watching a sponge absorb water and grow—everything the child experiences is new. Some refer to the infant as "the scientist in the crib" (Gopnik, Meltzoff, & Kuhl, 2001) because of the child's exploration of the world and the rapid assimilation of new knowledge.

Even before the maximum number of synapses is reached around age three, the child is observing the surrounding environment and beginning to selectively sort out different stimuli. Studies indicate that at about seven months, children give equal attention to changes in sound regardless of the language. However, by the age of 11 months, the infants already are beginning to be selective about which sounds are different and interesting. For example, at the age of seven months, Japanese and American infants are equally perceptive of the differences between the sounds of/ra/and/la/, sounds that are easily distinguished in English but more difficult for Japanese speakers. At 11 months, the infants in an English learning environment have improved their perception of the difference between the sounds, but the infants in a Japanese learning environment have lost some of their ability to perceive the difference in sounds. A similar study with American and Taiwanese infants, using sounds in Mandarin, showed a similar tendency, with the Taiwanese infants improving their ability to distinguish the Chinese sound and the American infants decreasing in their ability to make the distinction. In summary, in both cases, infants demonstrated a significant increase in "native-language phonetic perception" and a decrease in "foreign-language phonetic perception" over this short period of time (Kuhl, Tsao, Liu, Zhang, & De Doer, 2001).

As the child absorbs all these experiences and begins to make sense of the environment, some learning pathways are reinforced and others are neglected. From age three to about age ten, the number of synapses remains approximately the same. From age ten to adulthood, the number decreases as "pruning" takes place. If a learning pathway is used, the associated synapses are reinforced; those unused and inactive pathways are pruned. Much of this learning of meta skills that are developed during infancy later will be part of the tacit dimension of adult's knowledge. This relationship between learning and culture has been stated as ". . . once people have learned to learn in a given way it is extremely difficult to learn in any other way . . . culture reflects the way one learns" (Hall, 1990).

Others have considered the same issue of culture and learning. Vygotsky, with his collaborator Luria, proposed an explicit culture-centered approach to understanding learning (Vygotsky, Reiber, & Carton, 1987), and others developed this approach further (Forman, Minick, & Stone 1993; Kozulin, 1998). This perspective posits that culture (the collective) is a source of differences in cognition as (individual) cognitive processes are formed through socio-cultural activities. Cole and others developed a contextual theory of cognitive functions, which posits that different cultures have different systems

of mediated learning experiences (MLEs) (Cole, 1971). Such systems and the resulting MLEs are important to cognitive development, thus leading to differences that become evident when a learner makes a transition from one system to another. It is significant that these differences are not simply differences in a factual knowledge base but reflect differences in how an individual learns.

For example, Kozulin (1998) studied young adults who had grown up in one culture and were learning in a different culture. He found that these individuals exhibited specific difficulties associated with coding schema, concepts, graphic and symbolic devices used in communication of ideas (e.g., tables, ordering, plans and maps). The difficulties extended to cognitive activities such as the ability to identify or define problems (the ability to apply already acquired knowledge to a set of data and infer the implicit question or issue that needed to be resolved) and the ability to work with multiple sources of information. In short, the young adults were missing cognitive antecedents that would enable them to excel in their new environment.

Kozulin (1998) concluded, "...cross-cultural differences in cognition are most probably related to learning practices characteristic of different cultures and subcultures..." and "Two major determinants of cognitive prerequisites are conceptual literacy and facility with other symbolic psychological tools, and a mediated learning experience responsible for the integration of these tools into the cognitive system of the student (p. 129)." His work showed that intervention could help learners develop the basic skills that would enable them to learn effectively in the new environment.

The relationship between culture and learning (the acquisition of new knowledge) suggests that knowledge management techniques that are appropriate in one culture may not be effective for digital libraries that seek to serve multiple cultures. This suggests our first proposition:

P1: If a KMS is to be effective for learning by individuals with different cultural backgrounds, it should either a) have culturally sensitive access mechanisms or b) provide for skill-building that enables acquisition of knowledge classified and structured in non-native formats.

3 The Nature of Knowledge and Knowledge Management Systems

Philosophers and thinkers have considered the nature of knowledge for centuries, but recent interest in computer-based KMSs has renewed these discussions. For our purposes, three issues are important:

- The distinction between the explicit and tacit dimensions of knowledge
- The recursive relationships among data, information, and knowledge
- The cultural bases for learning and the meta skills that enable learning

3.1 Explicit and Tacit Dimensions of Knowledge

Explicit knowledge is, or can be, expressed in words or diagrams ("made explicit") and communicated to others using language, diagrams, or other tangible artifacts. Explicit knowledge typically may be recorded in articles and books. When one speaks of a digital library, the image typically is that of electronically stored articles and books, or digitally stored explicit knowledge.

The tacit dimension of knowledge, noted by Polanyi's now-famous phrase, "we know more than we can say" (Polanyi, 1967), represents knowledge that can not easily be articulated. Examples of the tacit dimension include physical skills, such as riding a bicycle, but also include concepts of values and facts that are commonly known (sometimes referred to as "common sense"). Conveying the tacit dimension of knowledge often is done through apprenticeships, during which those who have the knowledge (the "masters") demonstrate the application of the knowledge while the apprentices practice the skills under their tutelage. In some cases, the tacit aspects of knowledge can be transformed into explicit aspects (Nonaka, & Takeuchi, 1995; von Krogh et al. 2000). Culture, whether national or ethnic, conveys the tacit aspects of knowledge to persons who spend time in this environment. Much of cultural knowledge is tacit and may be difficult or impossible to make explicit (Hall, 1990).

3.2 Data, Information, and Knowledge

One generally imagines a hierarchy of "raw" data that are arranged in ways that are meaningful in order to produce information, and then this information is consolidated into coherent frameworks to form knowledge. In this view, generally taken as typical (Alavi & Leidner, 2001), data are precursors, or building blocks, of information, and information forms knowledge. However, as pointed out elsewhere (Tuomi, 1999), awareness of data requires prior knowledge: without knowledge of what is salient, one would not be able to distinguish "data" from "noise."

Perhaps the most meaningful conceptual framework within which to view the relationships among knowledge, information, and data is to consider the three concepts in a more hermeneutic, recursive process in which each is enriched and made meaningful by a consideration of the other. For data to be discerned from noise there needs to be a prior knowledge framework that anticipates possible signals. Given such a framework, data can be interpreted to create meaning and resolve questions (information). Information is the basis of communication between and among entities who can agree on interpretations and abstract concepts that can be the basis for new knowledge, which in turn can help recognize and interpret new data. At the same time, multiple schemas may be applied to develop alternative interpretations of data, providing for the construction of different meanings.

The recursive nature of data, information, and knowledge demonstrates the inadequacy of simple models that would create knowledge from information and information from data. An effective knowledge management system enables the creation of meaning and significance from the interactions of (prior) knowledge schema, (new) data, and (flows of) information. This suggests a second postulate:

> P2: An effective KMS enables flows of data and information so that individuals can create new knowledge by considering multiple interpretations of new data using alternative schema.

3.3 Knowledge Management Systems

We can now see the limits of the model in Fig. 1. Although a Knowledge Management System (KMS) is presumed to support each of the four steps in the knowledge management process model (Alavi & Leidner, 2001), the model is silent on how culture might affect these four steps. The model is incomplete because culture shapes the early development of the meta skills that enable later learning, and we might expect that individuals from distinct cultures to have different ways for creating, classifying and storing, transferring, and applying knowledge.

If one considers that one objective of an organizational KMS is to enable individuals to have access to the widest range of available knowledge, it should provide for access to both the tacit and explicit dimensions of knowledge, even though the mechanisms that can support these dimensions may differ. This leads to our next postulate:

> P3: For a KMS to be effective, it should facilitate the storage and transfer of both tacit and explicit aspects of knowledge.

Because so much cultural knowledge is contained in the tacit dimension, a corollary to this postulate is that an effective KMS will incorporate considerations of cultural knowledge in its design and implementation. Not only will an effective KMS reflect cultural considerations in the transfer of knowledge (Postulate 1), it will acknowledge the distinct cultural schema that may form the basis for classifying and storing knowledge.

3.4 A Boundary Spanning Model for Knowledge Management

Boundary spanning has been recognized as a necessary component in processes that require coordination and translations among diverse groups (Star & Greisemer, 1989) and different functional groups or "thought worlds" (Dougherty, 1992). If, instead of the linear model for knowledge management shown in Fig. 1, we consider a community of practice (Wenger, 1998) model for knowledge exchange, we might approach knowledge management much differently than has typically been done in the past. Individuals within

Communities of Practice (CoPs) share similar experiences, similar languages, similar ways of learning, and similar values.

We might extend the CoP concept to virtual communities—individuals linked through information and communications technologies—and refer to these communities as "Networks of Practice" or NoPs (Brown & Duguid, 2001). NoPs may represent domain-specific groups of individuals, and these NoPs may be wholly contained within a single organization or involve multiple organizations. With increasing globalization, NoPs may be global in scope, and digital libraries may seek to serve these global NoPs through knowledge management systems and practices.

Knowledge management in this conceptual model of communities becomes a task of "spanning the boundaries" between and across both knowledge domains and cultures. An earlier study (Mason, 2003) applied the boundary spanning concept to a review of KMSs, drawing on business literature reports of KMS implementations and effectiveness. The following paragraphs build on this study but apply the conceptual model to the need for digital libraries to span cultural boundaries.

Carlile's (2002) study of boundary spanning objects in a New Product Development (NPD) process provides a useful framework for examining the functions of KMSs. Carlile reports on an ethnographic study in which he worked with teams performing four primary functions in the creation of a new product (sales/marketing, design engineering, manufacturing engineering, and production). His work focused on how the teams worked together and dealt with the specialized knowledge of each area. Each of the four functional areas had different and specialized (in Carlile's terms, "localized and embedded") knowledge, structured in a way that made sense to the group. This knowledge specialization presented a barrier to the effective operation of the NPD team—the team found it difficult to exchange and synthesize knowledge as necessary for the successful development of a new product. Carlile observed that the team overcame this barrier by using boundary spanning objects that operated at three different levels: syntactic, semantic, and pragmatic (see slide 12).

At the syntactic level, shared repositories enabled communication of facts and agreed-upon tasks and actions. At the semantic level, standardized forms and methods enabled not only communication of facts but also provided a way for the different groups to clarify differences in meaning. The objects at this semantic level (standard forms and methods) enabled the team to translate the localized knowledge embedded in one group into forms that other groups could understand. At the pragmatic level, objectives, maps, and models enabled each group to transform embedded knowledge into knowledge that the entire team (and others not in the group) could understand.

In earlier studies of communities, Brown and Duguid (1998) pointed out the roles of boundary spanning activities and noted particularly the need for translators between communities. In commenting on Carlile's model, Brown (2002) suggests that Carlile's three levels correspond to three different

levels of knowledge ambiguity among communities of practice. At each level, different types of boundary objects are necessary for communication, knowledge transfer, and learning.

At the syntactic level, the differences across the boundaries are explicit, clear, and stable. A shared syntax is a necessary (but not necessarily sufficient) condition for knowledge sharing under these conditions. Taxonomies and classification (e.g., shared databases) provide this syntax and enable the sharing and transfer of knowledge among groups that have a clear understanding of their differences and understand that these differences are relatively stable.

This syntactic level is a necessary condition for knowledge sharing in digital libraries. Agreements on syntax are required for data to be exchanged between culture and communities. As a minimum, agreements at this syntactic level deal with technical standards and data architecture. Such agreements are a necessary prerequisite for the sharing of digital data, but—as Carlile and Brown have noted—the sharing of data is insufficient for the sharing of knowledge and learning.

At the semantic level, the differences across the boundaries may be neither clear nor stable (Brown, 2002). The solution to spanning the boundary at this level requires a method of translating meanings across boundaries. At this level, Carlile (2002) observed the use of standardized forms and methods as boundary objects. The equivalent objects for libraries might be thesauri, taxonomies, ontologies, and other metadata schema—each of which can help one community understand the structure of the specialized knowledge of another community.

For digital libraries seeking to serve multiple cultures, this semantic level is an additional necessary, but insufficient, prerequisite for knowledge sharing. For groups that have similar cultures, in which concepts are similarly named and relationships among concepts are similar, relatively simple translations that involve mapping of concepts from one language or mental model to another may be sufficient. For concepts such as technology, in which concepts are not stable and different cultures may progress at different rates, frequent communication between the groups may be necessary to assure currency in meaning and to assure that new concepts are absorbed by both groups.

At the semantic level, if there has been agreement at the syntactic level and there is the basis for a shared communication language, metaphors may be a useful approach to communicating new ideas (Lakoff & Johnson, 1980). For groups that have more distinct cultures, with few shared concepts, such translations or mappings may not be feasible without additional explorations at the pragmatic level. Indeed, even the metaphorical concept of a library may not be shared across some cultural boundaries (Duncker, 2002), and a digital library would be even more difficult to translate.

The pragmatic level provides a level for exploring other differences across boundaries. However, explorations at this level require some degree of agreement at the other two levels. In his discussion of this model Brown

(2002) notes that the knowledge of one group is not neutral to the knowledge of another group or community. Different communities may have different values and/or power relationships, and this level of difference requires boundary objects that provide additional capability beyond the first two levels. At the pragmatic level, the groups must transform their knowledge and create new (shared) knowledge rather than simply exchanging or transferring knowledge. Resolution of group differences requires objects such as models and maps, objects that enable the surfacing of assumptions, the tacit aspects of knowledge, and values. At this level, shared syntax and meaning must be sufficient to permit the sharing of methods of thinking and the development of a shared basis for understanding each group's values and mental schema.

In this model of boundary spanning, both the syntactic and semantic levels are necessary but insufficient for complete sharing of knowledge and the development of mutual understandings that would enable the creation of new knowledge. The mutual understandings and the associated trust that comes from these understandings may be necessary if a KMS is to benefit a digital library that can support users from multiple cultures. This suggests our fourth proposition:

> *P4: For a KMS to be effective in a digital library supporting multiple cultures, it should provide boundary spanning mechanisms and processes at the syntactic, semantic, and pragmatic levels.*

Mechanisms and processes at the syntactic and semantic levels of this model are readily apparent in observations of commercially based KMSs implemented at individual organizations, but corresponding processes at the pragmatic level are rare (Mason, 2003). The few cases in which such pragmatic level processes were reported noted the use of face-to-face meetings and structured forums in which distinct groups discussed values and differences. Some incentives and standards, designed to transform the executive level goals and values (e.g., the use of the KMS) into practice at the operational level of the firm, were judged to be pragmatic boundary spanning activities in which the boundary was a hierarchical rather than a national cultural or ethnic one (Mason, 2003). Table 1 summarizes examples of the boundary spanning approaches for each level of the model.

Table 1. Approaches to Boundary Spanning Between Communities

Model Level	Approaches and Example Mechanisms to Spanning the Boundary at Each Level
Pragmatic	Dialog Conferences
Semantic	Databases Metadata
Syntactic	Technical standards vocabulary, controlled vocabularies

Access to all the knowledge available within an organization is constrained when a KMS does not explicitly plan for the inclusion of multiple cultures in the creation, storage, and transfer of knowledge. A KMS designed by and for a particular organizational culture by its nature restricts the range of schema by which knowledge is classified and stored, and thus the creation of new knowledge is limited to discussions within the meta framework provided by the collective combination of these schema.

4 Conclusion and Discussion

4.1 Summary and Conclusion

Prior work in knowledge management systems can provide a useful framework to think about the development of digital libraries that can support global access to information. However, the theoretical goals of knowledge management systems—to enable access to the widest range of knowledge and to provide the capability to create new knowledge from existing knowledge— are not being realized in practice. Existing practices, as evidenced by published reports of knowledge management systems, inadequately provide for spanning the boundaries among cultures, thus limiting the knowledge that can be accessed and even the knowledge that can be created.

This paper suggests a three-level boundary spanning model to help guide the development of mechanisms for incorporating different cultures in a network of digital libraries. Each level presents different challenges for cooperation among countries and cultures.

The mechanisms for the syntactic level, including agreement on such topics as data architectures and other technical standards, while not simple, may be relatively straightforward. Groups already have made progress on these items and there is an existing base of knowledge on which to build.

Creating and using mechanisms at the semantic level represent additional challenges. However, once there is agreement on how data can be stored and exchanged across the boundary, different cultural domains can develop new shared understandings by a series of increasingly comprehensive and abstract exchanges at this level. The metaphor of building a bridge across a chasm illustrates how this can progress. In situations where there are few mechanical aids, two parties who desire to span the chasm between them can collaborate and build a strong bridge. First one party sends a thin string across the gap, perhaps by arrow or harpoon. This thin string is used to pull a stronger cord, which is used to pull a thin rope. The process is repeated until large cables can cross the chasm, and these cables can be used to support a walkway or roadbed.

The greatest challenge is at the pragmatic level. Progress at the first two levels is possible with a shared vocabulary and through translation processes that enable mapping of concepts from one culture to another. However, progress at both levels presumes some degree of shared values and goals. At the pragmatic level, differences in goals and values become apparent. Metaphors,

useful at the semantic level to introduce new concepts and relate them to existing shared schema, may not be effective if there are few shared values.

In the case of digital libraries, even the simple concept of a library and the value a library may bring to the community, while generally accepted across many developed or developing nations, is not widely accepted by all cultures. Much of the developed world makes the tacit assumption that sharing information generally is a positive process, with few exceptions. Exceptions might include the distribution of pornographic material or information essential to a country's security. The controlled distribution of intellectual property, while not a universally accepted, principle, may also be an exception. Some cultures, however, place other values on information and knowledge. For example, in an ethnographic study of the use of library by native Maori, it became evident that new Maori library users had difficulty accepting the fundamental purpose of a library. According to the researcher, the Maori believe that it was a violation of their core values to store and make accessible to many people their most valued knowledge, including Maori genealogical information. Such knowledge is considered tapu, or sacred, and the Maori hold that its dissemination should be done only in circumstances that respect the tapu nature of the knowledge (Duncker, 2002). In some cultures, knowledge is valued only if it is shared sparingly; it loses value if it is readily accessible (Harrison, 1995), much as many Western cultures view intellectual property. Such perspectives present barriers to realizing the concept of a network of digital libraries that enable the storage and transfer of knowledge electronically. Not only is there the barrier of converting the tacit aspects of cultural knowledge to more explicit expressions, there is the added barrier of the potential incompatibility of cultural values.

In conclusion, the application of knowledge management system principles to a digital library requires more than the application of the latest electronic storage and communications technology. To be effective at serving multiple cultures, a global network of digital libraries must create a culture within the network that appreciates and values the multiple perspectives of the distinct cultures the network seeks to serve. With the current state of development of digital storage of knowledge, it may be that digital libraries will require a range of human intermediaries to accommodate access by multiple cultures to the wide range of both tacit and explicit aspects of available knowledge.

4.2 Discussion: Implications for Research and Practice

Bridging the current gulf between the conceptual ideal for knowledge management systems and the level of current practice implies the need both for research and for possible changes in practice. The postulates presented above and summarized below provide a framework for considering the next steps.

P1: If a KMS is to be effective for learning by individuals with different cultural backgrounds, it should either a) have culturally sensitive access

mechanisms or b) provide for skill-building that enables acquisition of knowledge classified and structured in non-native formats.

P2: An effective KMS enables flows of data and information so that individuals can create new knowledge by considering multiple interpretations of new data using alternative schema.

P3: For a KMS to be effective, it should facilitate the storage and transfer of both tacit and explicit aspects of knowledge.

P4: For a KMS to be effective in a digital library supporting multiple cultures, it should provide boundary spanning mechanisms and processes at the syntactic, semantic, and pragmatic levels.

4.3 Implications for Research

Postulate 1 indicates that effective cross cultural KMSs should have either culturally sensitive access mechanisms or mechanisms that enable some users to learn new skills that enable them to access what may appear to them to be strangely classified and categorized knowledge. This postulate equivocates and does not say which approach would be more effective or more cost-effective. From a Western business perspective, this is an important issue, and research might help resolve it. Do we know enough about cross-cultural learning to say that training new users of a digital library is the best approach? The practice in industry has been to take this "culture free" approach and create an overriding corporate culture for knowledge management (Mason, 2003), and Kozulin's (1998) work indicates that providing "help" to those trying to move into a different intellectual framework is effective.

However, it is unclear that these approaches are more effective (or more cost-effective) than considering the needs of different cultures when initially designing and implement the KMS. By providing for new users to accommodate to the existing KMS, the system benefits from standardization of knowledge storage and transfer approaches. Enforcement of a single structure for knowledge and knowledge classification by necessity inhibits the storage and transfer of knowledge that does not fit within this framework. (Note that this sounds much like the old argument of how much "authority control" in bibliographic databases is appropriate—i.e., to what extent will the database constrain the range of descriptors and key words used?) What would be useful is research on the value of the knowledge that may be left out of a KMS if this approach is followed.

It is unrealistic to imagine that a KMS could manage to bridge the differences among all cultural communities. Indeed, even anticipating all the cultures that might comprise a global network of practice is unlikely to be a valuable approach. However, in any concrete situation, one might expect that a subset of the entire pluralistic community could be identified so that the KMS could be designed to meet the goals of the digital library aiming to serve this set of cultures.

Conceptually, what may evolve is a multi-tiered KMS, one in which a core knowledge base is standard but a separate set of knowledge bases may emerge as the need and opportunity arises. For the emerging knowledge bases, the form and structure of the knowledge (e.g., classification schema) as well as the knowledge itself may require the interaction of users and contributors to the system. The theoretical bases for such emergent systems are just beginning to be discussed and established (Markus, Majchrzak, and Gasser, 2002).

The second postulate calls for data and information flows to enable individuals to use alternative schema to "make sense of" data and information in new ways. This role of a knowledge management system—to enable the creation of new knowledge from the reinterpretation of existing knowledge and information—is an exciting and unexplored aspect of KMSs in a culturally rich setting. Additional research is needed to understand how individuals make sense of their environment, and this research likely will be disciplinary as well as cross-cultural.

In what may be related research, more work is needed to understand how a KMS can store and transfer the tacit dimensions of knowledge (postulate 3). The simple answer is that the KMS must include people who are aware of this tacit dimension, and this means that the effective KMS can be expected to have both human and electronic (digital) components. Just as today we have domain experts in a library who help provide services to users, and these humans serve both to interpret questions and synthesize the dimensions of knowledge that are not explicitly expressed, the global library may need to include human "experts" who are able to appreciate more than one culture and provide the interpretation and synthesis across the boundaries.

Finally, postulate 4 suggests the need for three levels of boundary spanning in digital libraries that are serving multiple cultures. This suggests the need for applied organizational and structural research to determine how this spanning can be organized. The syntactic and even the semantic boundary spanning activities are underway through international standards setting organizations. As noted earlier, the challenge comes at the pragmatic level. The evidence in industrial organizations for effectiveness at this level of boundary spanning involves forums and face-to-face meetings in which values and power issues are resolved through discussion. As a first thought, a multi-tiered organizational structure might serve a global network of digital libraries much as is done with international technical standards. At this level, in which issues fundamental to each culture must be resolved, it is even more important that trust among the participants be established. (In the metaphor of building the bridge, trust is the "common thread" by which additional progress toward shared understandings can be built.)

In summary, researchers who take seriously the postulates that outline the design and implementation requirements for a KMS intended to serve multiple cultures can identify many unknowns. Research is needed that ranges from

the conceptual to the pragmatic, and the best projects will combine elements of both—i.e., they will seek both understanding and practical applications.

4.4 Implications for Practice

Postulate 1 offers a choice between a KMS built with culturally sensitive access mechanisms or providing for skill-building that enables newcomers to the KMS to acquire knowledge that has been structured in non-native formats (i.e., foreign to the user). Because existing KMSs are not designed with these mechanisms in place, the most practical approach would appear to be to provide skill-building for non-native users. Design of such programs requires an understanding of the target market and a program tailored to enable that market to use the system. This is no different from other applications of target marketing and interface design, and if the KMS is not intended to serve a segment, there is no need to provide this segment with specialized training.

Postulate 2 calls for the KMS to enable multiple interpretations of data. In practical terms, this means that the KMS must be an organization that tolerates, and even encourages, "out of the box" thinking. The KMS should implement appropriate structural techniques to assure the flow of information and knowledge across its boundaries: visiting scholars, rotating assignments and cross-training of staff and personnel, etc. These and other approaches can help the KMS remain an open (rather than a closed) system and one in which new ideas can be absorbed and implemented.

The third and fourth postulates both require slack resources. This implies that the measure of KMS efficiency should not be limited to a simple, short-term measure that might be used for a more limited library that stores and transfers only explicit knowledge.

Postulate 3 calls for the KMS to facilitate the storage and transfer of both tacit and explicit aspects of knowledge. By the nature of the tacit dimension, the storage and transfer of these aspects of knowledge are imprecise, non-mechanistic processes. Our current understanding of the tacit dimension indicates that this would require the inclusion of staff members (who are aware of the tacit dimension of knowledge) within and across the boundary of the KMS. The storage and transfer can be measured (with cognitive and behavioral approaches), but the KMS will need resources to facilitate the staff activities of learning and transferring this tacit dimension. The selection of which aspects of the tacit dimensions to store/transfer depends on the cultures being served.

Postulate 4 states that the KMS should provide for boundary spanning processes at all three levels. In the early development, the KMS will need human (perhaps face-to-face) interactions at all three levels.

Over time, the syntactic level interactions may be accommodated by shared data and knowledge bases. Similarly, machine translation may develop to the point where cognitive mapping across cultural domains will be possible. However, at the pragmatic level human interactions across the boundaries of

the cultural domains will remain important. This suggests that librarians and information officers will include discussion forums and other communications channels so that issues of value may be discussed and decisions reached about how the goals of the KMS can reflect these values. Additional skills—skills not presently taught in information schools—may be required so that professionals can facilitate these forums with a sensitivity to the values and tacit dimensions of the knowledge embedded in the different communities.

In practice, these forums may not be face-to-face, and computer mediated communication may be even more effective. A key issue is trust, and different cultures may find it either more or less helpful to have longer periods of face-to-face communication. In some cases, the nominally more constrained ("less rich" media) electronic channels actually may be more effective. In discussions of US-China research and entrepreneurial collaborations, email was much more effective than instant messaging or face-to-face communications. Because the exchanges were done in the common language of English, the Chinese participants were much more comfortable having time to reflect on the message, assuring themselves that they understood its meaning and implications, and not being pressured for a rapid response (Jin, Mason, & Yim, 1998).

In summary, the practical implementation of a KMS that can serve multiple cultures presents a challenge for librarians and information officers. Existing technology can be an important part of a system for storing and transferring knowledge, but the cultural boundaries require sensitive navigation of values and knowledge schema that may be incongruent, and this suggests that human intermediaries may remain essential participants in the knowledge management system.

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Sensemaking and the Creation of Social Webs:

The Role of Storytelling and Conversations as Knowledge Processes

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Abstract: Narratives have long remained unacknowledged as knowledge processes within organizations. Narratives are so ubiquitous in nature and so taken-for-granted that they have remained in the shadow of formal knowledge management initiatives and programs. Yet, they play a critical role in the creation, transmission and application of knowledge in the workplace. This chapter addresses two types of narratives—storytelling and conversations. The role of these narratives as knowledge processes is examined, especially their contribution to sensemaking and the creation of social webs in work settings. How storytelling and conversations can be enabled within the contexts of designing work, workspaces, and enabling these narratives in virtual and global organizations is also briefly discussed.

Key words: storytelling, conversations, sensemaking, social webs

1 Introduction

Narratives are the foundation of social interactions, a necessary part of knowledge creation, transmission and application. Yet, the role of narratives as knowledge processes has remained largely unrecognized and unacknowledged in organizations. Narratives are such a ubiquitous part of social interactions both in the workplace and outside, that their contribution is often ignored in favor of more formal knowledge management projects and initiatives. This chapter addresses two types of narratives, storytelling and conversations; examines their roles as knowledge processes, and analyzes their contribution to sensemaking and the creation of social webs within organizations.

2 The Role of Language in the Cognitive Process

Cognition in organizations is distributed across individuals in varied communities, each of whom is engaged in tackling unique aspects of the organization's functioning. These communities need to interact with each other in a

sensemaking process, thereby creating the dynamic whole necessary for the organization to function (Boland, Tenkasi, & Te'eni, 1994). Since meaning in organizations is socially constructed, language becomes the conduit through which the sensemaking process takes place (Cohen & Levinthal, 1990; Pondy & Mitroff, 1979; Swap, Leonard, Shields, & Abrams, 2001).

Language is the essential tool that people use to make sense of their environments and share their understanding with others around them, to decipher the complexities that exist in organizations and comprehend the organizational environment. The importance of language to knowledge processes has been abundantly documented in the literature. In their analysis of factors that influence the combination and exchange of knowledge in organizations, Nahapiet and Ghoshal (1998) pointed to the importance of shared language; the means by which individuals engage in interactions with each other. Boland and Tenkasi (1995) argued the importance of communication in strengthening "perspective taking" and "perspective making" in organizations. Nonaka and Takeuchi (1995) also emphasized the importance of language in organizational knowledge processes. They listed three characteristics of knowledge creation: the use of metaphor and analogy to articulate tacit knowledge; the use of dialog and discussion to convert individual knowledge to organizational knowledge; and the use of ambiguity and redundancy to help create new ways of thinking.

Organizations are social communities wherein individuals and groups use relational structures and shared coding schemes for the creation and dissemination of knowledge (Zander & Kogut, 1995). Blackler, et al. (1998) argued the importance of achieving shared understandings to facilitate the sharing and absorption of knowledge. They pointed to aspects of organizational knowledge that are dependent on cultural meaning systems that arise from socialization and acculturation; features that are socially constructed and heavily dependent on the use of language. Language is important in the sharing of know-how (Kogut & Zander, 1992), in the creation of shared mental models (Madhavan & Grover, 1998; Senge, 1990) and in arriving at shared understandings (Nonaka, 1991). Incompatibilities in language and cultural conventions often results in a lack of shared context between senders and receivers of knowledge, referred to by Sulanski (2000) as the lack of absorptive capacity. Common understandings of knowledge and collective sensemaking occur through the use and application of language (du Toit, 2003), expressed through narratives within the organization. Narratives, therefore, become the primary means by which shared language and shared meanings evolve in organizations.

2.1 Narratives as Knowledge Processes

From the early hunter-gatherers who shared knowledge about game, techniques for refining tools, and other survival mechanisms to today's technology driven organizations, human beings have been engaged in generating

and applying knowledge through the use of narratives. Narratives are considered the fundamental cognitive processes through which people create and maintain understandings of themselves and their worlds (Bruner, 1986, 1990). The literature on narratives includes storytelling (Boje, 1991; 1995; Gabriel, 2000), myths (Campbell, 1976; Mahler, 1988), fairytales (Monin & Monin, 2005), dialog (Nonaka & Takeuchi, 1995) and conversations (Davenport & Prusak, 1998; Krogh, Ichijo & Nonaka, 2000). Narratives have been, and continue to be crucial mechanisms by which individuals and groups create, share and use knowledge in work contexts.

Every organization has functional spaces where individuals and groups engage in spontaneous, unsupervised activities that essentially serve the process of creating shared understanding and shared meaning. Gabriel (1995) referred to these spaces as the unmanaged organization; that part of an organization, which is unconstrained by formal rules and policies. Individuals participate in storytelling, creating and sharing myths and fairytales, and engage in conversations and dialog during their everyday interactions in the workplace. These interactions, many of which are spontaneous exchanges, are rarely monitored or recorded; often remaining well below the radar of those who initiate and manage knowledge related programs. Thus, a large part of the process of sensemaking and the creation of social webs occur within the terrain of the unmanaged organization; and a critical part of the engine that drives the unmanaged organization is narratives.

While all forms of narratives contribute to the generation and evolution of knowledge in organizations, of particular interest in this chapter are the closely linked narratives of storytelling and conversations. Storytelling is often initiated when individuals engage in a conversation (Mitchell, 2005), creating a context for the delivery or construction of the story. Likewise, the narration of a story could lead to an animated conversation when the listeners participate in the storytelling process. As knowledge processes, storytelling and conversations serve both basic and highly complex functions. At the basic level, these narratives form the foundation for social interactions, functioning as the primary communication tools by which individuals interact with each other in the workplace. At more sophisticated levels, storytelling and conversations serve as the conduits for problem solving, strategic decision-making, and for managing the everyday operations of a business. Storytelling and conversations craft the circumstances that facilitate the exchange of ideas and information, thereby making them potent knowledge processes. However, since these narratives exist primarily in the realm of the unmanaged organization, their role as knowledge processes remains unrecognized and unexamined.

2.2 Stories and Storytelling

Stories have been defined as "an oral or written performance involving two or more people interpreting past or anticipated experience" (Boje, 1999, p. 111).

The strength and power of stories is rooted in their ability to involve more than one person in an intimate experience of creating and sharing meaning, laying the foundation for sensemaking and the creation of organizational social webs. The role of storytelling and its contribution within organizations has been relatively well documented in the literature. Stories and storytelling have been grouped into multiple categories—Martin et al. (1983) identified seven types of common organizational stories, while Klein (1999) described eight characteristics of a story and Gabriel (1995) discussed four modes of subjectivity in organizational narratives. According to Boyce (1996), the key functions of storytelling in organizations include: confirming shared experiences and shared meaning, socializing new employees and contributing to organizational vision and strategy, preparing groups for activities that promote the organization's purpose, and providing a vehicle by which the experiences of individuals and groups are expressed. In addition, stories facilitate knowledge acquisition (Patriotta, 2003), reinforce norms (Czarniawska, 1997), address the expectations of new employees (Fletcher, 1996), and convey and strengthen the organization's culture (Boje, 1991; Jordan, 1996).

Gabriel (2000) defined storytelling as the art of creating knowledge through the process of creating meaning out of experiences in organizations. Stories find their sources in everyday organizational experiences. These experiences are then converted into stories when they are woven into a meaningful format that can be easily shared and absorbed by individuals and groups within the organizational context. Thus, stories often represent *packaged knowledge*, knowledge that comes with content, context and meaning.

The term "packaged knowledge" however, does not imply that stories are static narratives, passed on from one person to another as inert content. While there are some stories that are so well evolved over time that they are narrated without significant changes, most stories are created and transmitted through a highly interactive and participative process involving two or more individuals. Oral storytelling is a group process (Linde, 2001); one in which the storyteller and the listeners participate in a complex activity of co-creating and sharing the content and the meaning of the story. In this process of storytelling, knowledge gets created, packaged and transmitted within and across knowledge communities in organizations.

2.3 Conversations

While the role and significance of storytelling has been relatively well examined in the literature, very little attention has been paid to conversation and its role in the knowledge arena. This is probably because storytelling is much more structured an activity as compared to conversations, which tend to be nebulous and thus more difficult to study systematically. Krogh, Ichijo and Nonaka (2000, p. 125) described conversations as the "most natural and commonplace of human activities." Conversations tend to be informal in nature; primarily driven by immediate circumstances.

Nevertheless, conversations are extremely significant knowledge processes, playing a critical role in sensemaking and the development of social webs in organizations.

Conversations, as knowledge processes, serve two purposes: knowledge confirmation and knowledge creation (Krogh, Ichijo & Nonaka, 2000). Knowledge confirmation refers to verifying explicit knowledge, and conversations that aid this process tend to be limited in scope and focussed on facts and concepts attached to a bounded reality. Knowledge confirmation leads to more effective problem solving by constantly verifying expertise that has already been declared valid within the knowledge community. Conversations, whose purpose is knowledge creation, do not have a well-defined knowledge foundation. Such conversations tend to be broader in scope, and focus more on the future in order to define new organizational realties. The power of conversations lie in their ability to advance the creative power of an individual, combine it with that of others, resulting in knowledge creation that is far beyond the capacities of a single mind (Galvin, 1996).

Conversations can be both *formal* and *incidental* in nature. Formal conversations are those that occur at meetings, or those initiated by individuals with the specific aim of clarifying, confirming, or sharing particular pieces of information. On the other hand, incidental conversations—which can be as powerful if not more so than formal conversations—are those described as "water-cooler" conversations. Such conversations are characterized by more casual exchanges between individuals that may eventually result in confirming or creating knowledge. These interactions, whether they are around the water cooler or on a golf course, are means of putting together pieces of information—building the jigsaw that eventually results in individual and organizational knowledge.

3 The Role of Storytelling and Conversations in the Sensemaking Process

Organizations are complex multidimensional systems that have to manage information from multiple sources, both from the external environment and from within. Informational inputs from these varied sources need to be adequately interpreted before they can be meaningfully applied to meet the needs of the system (Daft & Weick, 1984). Sensemaking is defined as the "process through which various information, insight, and ideas coalesce into something useful, or stick together in a meaningful way" (Dougherty et al. 2000). Sensemaking is the means of developing collective understandings within small groups and the organization as a whole over a period of time. According to Weick (1993, p. 635), the premise of the concept of sensemaking is that "reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense of what occurs." Sensemaking is a socially constructed process (Berger & Luckmann, 1967), one in which

individuals engage with others to create and share meaning in order to understand and effectively function within their own contexts. Sensemaking occurs when information is interpreted and reinterpreted over time, based on actions and their consequences within the community (Weick, 1995).

Narratives that are created and shared by members of a knowledge community facilitate the process of sensemaking. Storytelling and conversations help individuals to interpret cues from the external and internal environments and convert them into knowledge that can be utilized within their specific contexts. Weick (1995) introduced the concept of "intersubjective sensemaking," a process by which individuals make sense of new and tacit knowledge. This process is driven by face-to-face interactions where individuals communicate their understandings and exchange interpretations. Conversations are the primary means by which face-to-face communications take place in organizations. The process of intersubjective sensemaking is further enhanced when individuals narrate their stories and participate in the storytelling process. In the following section, the contribution of storytelling and conversations to sensemaking are examined in six areas: (1) articulating knowledge, (2) transmitting tacit knowledge, (3) shaping the knowledge context, (4) facilitating easy absorption, adaptation and recall, (5) just-in-time sharing of knowledge, and (6) linking knowledge levels within the organization.

3.1 Articulating Knowledge

The process of converting individual or group knowledge, both tacit and explicit into a form where it can be easily articulated, is one of the first steps in the sensemaking process. Stories help to articulate knowledge by providing easy means of combining verbal and visual information (Swap, Leonard, Shields, & Abrams, 2001), which also leads to better retention and recall. Stories are also able to transfer the complexities of work practices (Crossan et al., 1999) much more effectively than information that is delivered through databases, documents and training programs. It therefore allows the articulation of the subtleties and the richness of information that is so vital to sensemaking and the creation and application of knowledge in the workplace.

Stories that are created and shared within communities of practice enhance the community's reserves of expertise (Brown & Duguid, 1991) by providing the means through which knowledge is articulated and remembered within the context of the specific community. Within well delineated settings such as work groups, storytelling and conversations often help articulate technical understanding and interpret critical knowledge, bridging the gap between know-what and know-how. For example, at Xerox Corporation, "war stories" recounted by photocopier technicians helped to share technical expertise—a process of sensemaking within the community (Orr, 1990).

Conversations further assist in clarifying and enhancing the articulation process. Conversations, whether at formal meetings or by the water cooler, allow individuals to talk to others for specific pieces of information, discuss

and debate the narrator's stream of thought and meaning, creating the context for individual and group knowledge to be articulated in a form that is cogent and acceptable to the knowledge seekers. Such interactions create the means by which the nuances and meaning of knowledge is articulated for application by individuals and groups within the organization.

3.2 Transmitting Tacit Knowledge

In every organization, there are elements of knowledge commonly referred to as tacit knowledge that do not lend themselves easily to codification and capture. Tacit knowledge tends to be personal in nature, often so taken for granted, so deeply embedded in individuals that articulating it is challenging, even if individuals are motivated to share what they know with others (Nelson & Winter, 1982; Nonaka, 1991). Though expressing tacit knowledge in a form that can be utilized by others is arduous and often nearly impossible, the process of sensemaking would remain incomplete unless sufficient tacit knowledge possessed by individuals and groups were made explicit and shared within relevant contexts.

Nonaka and Takeuchi (1995) referred to the externalization process—the means by which individual tacit knowledge is converted into a form that allows it to be used by others. Storytelling and conversations play a considerable role in allowing individuals, whether consciously or unconsciously, to externalize their tacit knowledge. This is because stories allow tacit knowledge to be illustrated and absorbed, providing a bridge between the tacit and explicit domains (Linde, 2001). In addition, stories and conversations allow the use of metaphors, analogies, hypotheses and concepts, all of which supports the conversion of tacit knowledge into understandable knowledge.

The sharing of tacit knowledge is the first and most critical step in the knowledge creation process and conversations, which facilitate the exchange of ideas, are crucial to this process (Krogh, Ichijo & Nonaka, 2000). The mutual give-and-take that occurs during conversations allows individuals to create shared context and a shared intellectual space. Once this space is created, the ability to articulate and the ability to absorb knowledge increases significantly, making it easier for individuals and groups to exchange tacit knowledge. Stories and storytelling also lead to the creation of shared mental models and common understandings. According to Swap, Leonard, Shields, and Abrams (2001), even a single story that is highly contextualized has the ability to convey tacit knowledge. Stories, as packaged knowledge, allow individuals to share their experiences and their distilled learning from the experiences.

3.3 Shaping the Knowledge Context

The process of sensemaking is driven by various factors in its immediate organizational context, culture being a critical one. Sensemaking is only possible when people can share the knowledge they have and build on the

knowledge of others. Much of this knowledge sharing is shaped by the culture of an organization (DeLong & Fahey, 2000). Regardless of how strong an organization's commitment is to knowledge management, it has been found that the influences of the organization's culture are much stronger (O'Dell & Grayson, 1998). The most dominant transmitters of organizational culture are narratives that encompass norms, values and shared understandings.

The role of stories and storytelling in determining and transmitting organizational culture has been well documented (e.g., Boje, 1991, 1995; Jordan, 1996). Stories act as cultural codes (Hansen & Khanweiler, 1993), socially constructing representations of events that have some significance to individuals in an organization (Feldman, 1990). Storytelling and conversations not only transmit culture, but also are often the very instruments used to fashion the norms and practices of the knowledge community or the organization as a whole. An organization's culture represents shared assumptions that are reflected in values, norms and practices (Schein, 1985). Stories are often used to generate and maintain organizational norms that govern everything from informal interactions between individuals to formal policies and procedures that affect the process of sensemaking. Stories and conversations further serve to introduce these norms and values to newcomers and reinforce them to others within the organization. This process results in the creation of a shared culture, without which it is difficult to communicate and transfer knowledge effectively (Davenport & Prusak, 1995).

Learning the stories of a group or the organization as a whole is one way of learning the culture of the larger community. According to Linde (2001), critical to becoming part of an organization is learning to tell its stories and one's own in a manner that is consistent with the rules of the larger group. Becoming integrated into the culture of the knowledge community provides individuals with the shared context and shared vocabulary that is essential for sensemaking. In addition to storytelling, formal and incidental conversations also contribute to determining and preserving the cultural context of organizations. Conversations are the vehicles by which information about "the way we do things around here" is most readily transmitted. They are the narratives used on an everyday basis to set the cultural context for sensemaking in organizations.

3.4 Facilitating Easy Absorption, Adaptation and Recall

"If you want people to remember information and believe it, your best strategy in almost every case is to give that information in the form of a story" (Solovy, 1999, p. 45). Since stories represent packaged knowledge, it allows for relatively easy repetition and recall. Stories are not bound to the initial storyteller or the group whose experience led to the creation of the story. Good stories can be repeated numerous times by different individuals, expanding the scope of the sensemaking processes. Knowledge is considered to be *sticky* (Szulanski, 2000; Von Hippel, 1998), stickiness being the incremental

expenditure involved in converting knowledge into a form that is usable and easily understood by the information seeker. When the cost is low, the stickiness of the knowledge is low. According to von Hippel, stickiness for the knowledge supplier comes from the tacitness of the knowledge that has to be shared, while absorptive capacity creates stickiness for the knowledge user. Knowledge transmitted through stories and conversations address the issues of tacitness and absorptive capacity because of the bounded context of stories and the free give-and-take format of conversations.

In analyzing the role of storytelling in the organizational learning process, Taylor, Fisher and Dufresne (2002) referred to the aesthetic experience of enjoyment that comes from storytelling, resulting in more engagement among participants in the experience and greater repetition over a period of time. Apart from the enjoyment factor, stories facilitate recall because of a feature called "recipient design" (Sacks, 1992 as cited in Linde, 2001). Recipient design refers to how narrators of stories shape the story to respond specifically to the listener's context. The process of adapting and arranging the narrative to facilitate understanding not only encourages easy recall; it also simplifies and expedites sensemaking for those engaging in the process. Stories are more colorful, distinct, engaging and related to personal experiences than organizational rules and procedures. These characteristics of stories tend to make them more memorable, allowing them to have significant influence in guiding organizational behavior and increasing the likelihood of being remembered over a period of time (Swap, Leonard, Shields & Abrams, 2001). Thus, it can be argued that storytelling contributes to the sensemaking process by creating and sustaining organizational memory.

3.5 Just-In-Time Sharing of Knowledge

Sensemaking is often considered to be a process that evolves over a period of time within organizational contexts. However, when sensemaking is examined more closely, there appears to be a time continuum, ranging from issues that need immediate resolution to those whose meaning and purpose are identified over time. Storytelling and conversations, critical to the sensemaking process in general, are especially important to sensemaking that has to take place in limited periods of time. Two aspects of the nature of knowledge have been identified as critical barriers to effective knowledge sharing: limited shelf life and radical uncertainty (Weiss, 1999). Limited shelf life of knowledge points to the dynamic nature of knowledge that often causes it to become inaccurate or obsolete quickly as the application it supports often evolves constantly. An example of limited shelf life would be knowledge about technology-based applications that have rapid evolution cycles. Radical uncertainty refers to the variations required in the application of knowledge across different contexts and different settings, that are often not obvious before the individual or group engages with the situation. Radical uncertainty is one characteristic of new product development teams, where individuals from multiple areas of expertise

have to pool their knowledge to develop the new product or solution. Both limited shelf life and radical uncertainty demand that knowledge be made available on a just-in-time basis, allowing for interaction between individuals to adapt it to the situation at hand.

To speed up the sensemaking process, or to enhance the effectiveness of knowledge sharing, organizations have invested considerable resources to design and implement technology based knowledge management systems. Research has provided evidence of the use of technology to capture, store, classify and retrieve information through systems such as digital libraries, databases, data mining, knowledge directories and organizational memory systems(e.g., Ackerman, 1998; Weiser & Morrison, 1998; Constant, Sproull & Kiesler, 1996). However, storytelling and conversations have the advantage of being the means through which just the required amount of information is shared in relatively short periods of time.

A relevant story that is narrated at an opportune moment plays an important role in relaying important information in a manner that is easily absorbed and understood. Conversations with experts and peers in an organization that are directed toward knowledge acquisition or knowledge confirmation often save the information seeker the time involved in researching databases, which in many cases contains information that is not well organized nor easily accessible. Even if the information is easily accessed, it may require interpretation before it can be applied in a work situation; the interpretation often requiring the insights of an expert. In most organizational settings, it is often much easier to walk over to an expert's cubicle and engage in an informal conversation about an issue than to engage in an information research activity, especially if the subject is complex and does not lend itself to simple explanations or answers. Additionally, the confidence that individuals derive from information exchanges with experts should not be underestimated.

3.6 Linking Knowledge Levels Within the Organization

Knowledge exists at multiple levels in the organization—explicit codified knowledge in documents and databases; knowledge that resides in organizational norms, procedures and protocols; and tacit knowledge that exists within individuals and communities of practice. Connecting knowledge across these varied sources and levels is a necessary part of the sensemaking process. Storytelling and conversations play a critical role in this process. These narratives help to weave knowledge elements together and interpret the knowledge that exists at the different levels within the organization. For example, knowledge contained in databases and documents is often instantly understood only by those who created and contributed it or others in their immediate work setting. If this knowledge has to be accessed by others, there needs to be a communication process that allows the knowledge to be interpreted and absorbed by others who seek it. Conversations with the knowledge contributors are often the only means by which the codified

knowledge is converted into either explicit or tacit individual or group knowledge. As another example, knowledge that is embedded in organizational processes is often made explicit through storytelling or conversations with those who are close to or created the processes. Narratives therefore serve as the bridges that link individuals with knowledge that exists at different levels within the organization.

4 The Role of Storytelling and Conversations in the Creation of Social Webs

Since human beings are social animals, it is easily understood why interpersonal relationships are critical to the effectiveness of knowledge processes within organizations. Organizations are social communities within which individual and group expertise is exchanged and transformed into applications that advance the goals of the firm (Kogut & Zander, 1992). Formal and informal conversations and the ability to engage in storytelling are among the means by which these social communities are created and sustained in the workplace. The social webs that are formed as a result of interpersonal interactions provide the formal and informal connections that are the pathways to knowledge creation, exchange and application. Since individuals who share friendships and informal personal relationships with each other are more likely to communicate with each other (Amato, 1990; O'Reilly & Chatman, 1986), it is worth understanding how narratives advance social relationships, which in turn, create and strengthen social webs within organizations. In the following section, the contribution of storytelling and conversations in the creation of organizational social webs are examined in the following areas: (1) initiating and building social connections, (2) strengthening informal channels, and (3) facilitating knowledge sharing.

4.1 Initiating and Building Social Connections

The act of engaging in a storytelling activity or participation in a conversation by itself binds individuals within a social circle, whether the activity has any instrumental outcomes or not. Though the process of storytelling often begins with one individual narrating a story, it is not contained within that individual. The power and influence of stories come from their emotional appeal and the ability to draw listeners into the process. The process of storytelling creates a feeling of connectedness, because when individuals engage with a story, they often remember their own experiences that resonate with the story being told (Taylor, Fisher & Dufresne, 2002). Additionally, listeners in the storytelling process are not just passive recipients of the information. Oral storytelling is a group process (Linde, 2001). Listeners engage in the process; agreeing or disagreeing with the storyteller and shaping

and changing the narrator's version of not just the story, but often, its meaning as well (Linde, 2001).

As with storytelling, conversations are a conduit to building and strengthening social connections. Formal conversations help to build relationships among individuals who use the interaction to advance and clarify knowledge within their specific context. Incidental conversations have a powerful role to play in the development and sustenance of social networks. This everyday social mechanism used by individuals to exchange information about hobbies and interests, families, politics and the news of the day is instrumental in establishing human connections between people in the workplace. The ability to engage in a conversation is often the first step in building professional relationships and friendships. So even if every conversation does not result in a tangible knowledge exchange, they are the means by which social webs are built and strengthened in the workplace.

4.2 Strengthening Informal Channels

Social connections established in the workplace serve as the channels for knowledge creation, dissemination and utilization. These informal social networks are vital to facilitating learning and knowledge sharing in organizations (Brown & Duguid, 1991; Nahapiet & Ghoshal, 1998). Storytelling and conversations provide individuals the opportunity to build informal networks. Once created, individuals are more likely to communicate more frequently and with more intensity with others within the network, strengthening the network as a whole.

In their theory of social capital, Nahapiet and Ghoshal (1998) described social capital as the sum of the networks and the assets that can be mobilized through the network within organizations. According to them, the primary benefits of networks are that they provide easy access to resources, which, in turn, facilitate knowledge exchanges by providing access and referrals to the right individuals in a timely manner. Gold, Malhotra, and Segars (2001) reinforced the need for an organizational culture that promotes formal and informal interactions among individuals. They argued that dialog between individuals is the basis for the creation of new knowledge in organizations. There is sufficient empirical evidence that supports the importance of informal social networks in the knowledge exchange process. Rulke and Zaheer (1999) referred to these networks as *relational learning channels*—informal opportunities that facilitate knowledge transfer. Truran (1998) described how informal networks lead to the creation of knowledge relationships that are then critical to sharing tacit knowledge. Research also indicates that even when clearly designated formal channels of communication exist in organizations, individuals tend to rely more on informal relationships for their interactions (Stevenson & Gilly, 1991). Informal social networks often tend to bypass the formally prescribed pathways for interaction and communication within the organization.

Informal channels, enhanced through conversations and storytelling not only allow individuals to be better informed about the knowledge needs of others, but also serve as the means to satisfy their own knowledge requirements. Boje (1991, p. 107) referred to the "talk-by-turn-situations" that occur during storytelling, where the narrator and the listeners participate to create a shared experience. Likewise, conversations give individuals the opportunity to identify others who share common working goals and strategic interests within the organization. This not only creates and strengthens relationships, but also allows knowledge to be shared on a need-to-know basis (Jones & Jordan, 1998), thereby enhancing the productivity of the shared knowledge and the efficacy of the sharing process.

4.3 Facilitating Knowledge Sharing

Storytelling and conversations, in the process of building social webs, serve as instruments of knowledge sharing within organizations. Since knowledge exists across diverse units in the organization, knowledge dispersion is a significant barrier to effective knowledge sharing (Weiss, 1999). Conversations that connect individuals in informal relationships across the organization not only lay the foundation for and strengthen social networks, but also serve as the means by which dispersed knowledge can be readily identified. According to Kogut & Zander (1992), an important aspect of knowledge in organizations is simply knowing who knows what within the knowledge community. When a problem arises that needs multiple pieces of knowledge for its resolution, the quickest method of identifying individuals and units that possess this knowledge is by initiating communication through the social networks within the organization. Conversations, both formal and incidental, serve as the means of activating informal social webs, helping to identify relevant individuals and groups whose knowledge and expertise might be relevant to interpreting and resolving the knowledge needs of a situation.

In order for it to be relevant, knowledge has to be created and applied through interactions with all stakeholders involved in the situation (Weiss, 1999). The give-and-take of conversations and the storytelling process provide the necessary interchange for knowledge sharing and application. This interactivity between individuals allows for the customization of knowledge to the immediate requirements of the situation, neutralizing the problem of creating and storing the knowledge in advance. When individuals from different organizational units converge to solve a problem, their diverse knowledge is pooled when they engage in purposive conversations. Such conversations may also result in individuals narrating stories from their experiences of similar problem solving situations. These exchanges not only enhance the effectiveness of knowledge sharing, but also serve to create new social connections and strengthen existing ones.

A unique advantage of storytelling and conversations as knowledge processes is that they are not bound by the physical spaces of the organization

nor by its communication infrastructure. Individuals communicate through conversations and stories both in the workplace and outside it. Whether on a golf course or over lunch in a restaurant, individuals can share what they know about a problem or situation without being limited by the confines of the workplace. Even when the interaction does not result in a specific knowledge outcome, engaging in a stimulating conversation or exchanging stories of common interest serves to strengthen the relationship between the individuals concerned, and that, in turn, is likely to facilitate knowledge sharing at some point in the future.

5 Enabling Storytelling and Conversations

There is implicit understanding in the literature that narratives are critical to knowledge creation, transmission and application in organizations. Yet their role as knowledge processes has not been examined adequately by researchers or capitalized on by organizations. The narratives that have been discussed in this chapter often get buried within the everyday actions of work, and the hard-to-grasp nature of narratives creates significant challenges for even those who wish to understand and utilize them. Thus the focus of organizations has veered toward tackling those aspects of knowledge and developing those knowledge processes that are more readily accessible.

So the question remains, how should organizations approach storytelling and conversations as knowledge processes? Can, and indeed, should these narratives be considered from the perspective of managing them? This chapter suggests that for the most part, narratives thrive outside the realm of the managed organization. To approach them from the traditional perspective of knowledge management would be to deny their unique contributions as knowledge processes. To force fit storytelling and conversations into knowledge management initiatives would be to undercut the unique role of these narratives in the knowledge process. Swap, Leonard, Shields and Abrams (2001) cautioned against directly manipulating the storytelling process in organizations. They recommended instead that storytelling be influenced and enabled to enhance their value to the organization. While the value added to the organization from storytelling and conversations cannot be computed accurately, it is nevertheless important to examine the possibilities of enabling these narrative within three contexts: the design of work, the design of workspaces, and encouraging storytelling and conversations in virtual and global organizations.

5.1 Design of Work

"Conversations are the most important form of work" (Webber, 1993, p. 28). Yet, they are often considered an insignificant activity in most work settings, something that is incidental to what most individuals are hired to do. Water

cooler socializing is often considered a waste of time by those who do not appreciate the significance of such interactions in the process of sensemaking and the creation of social webs in the workplace. In their rush to create "efficiency," organizations often discourage opportunities for narratives, impacting long term effectiveness. Discouragement of social interactions can be as serious as commands from the CEO asking employees to not engage in casual social interactions such as the directive issued by John Akers when he was the head of IBM (Davenport & Prusak, 1998). If organizations are to capitalize on narratives as knowledge processes, individuals need to be able to engage in storytelling and seemingly purposeless conversations without the threat of sanctions, even if it is just in the form of disapproval from colleagues and supervisors.

Organizations may have to reconsider what *being at work* means if they are to utilize the potential of conversations and stories to create new knowledge and apply it appropriately in order to advance goals and achieve strategic objectives. Creating or identifying occasions where individuals can exchange stories is one way of encouraging storytelling within the organization. Linde (2001) presented a taxonomy of potential storytelling occasions; events that lend themselves to storytelling without the need for any formal intervention. Recognizing the potential of such events and promoting informal interactions between individuals will allow organizations to benefit from the creation of social webs and the innate sensemaking that occurs during these interactions.

5.2 Design of Workspaces

In addition to rethinking the nature of work, the design of the work environment also needs consideration when thinking about enabling narratives in the workplace. Nonaka and Konno (1998, p. 40) described the concept of *ba*, defined as "a shared space for emerging relationships," where space refers to physical, virtual and mental spaces, and any combination of the three. Mental spaces refer to shared ideas, experiences and ideals within the organization, and they are critical to the creation and application of knowledge. Within organizations however, it is much easier to manage the creation of physical and virtual *ba*. The need for physical spaces that facilitate the "chatting" and storytelling needed to build social networks are often overlooked in the design and construction of workspaces. Offices often designed to economize the use of space deny employees the room to engage in spontaneous exchanges which often leads to the creation of new social relationships or the creation and adaptation of knowledge to address specific challenges in the organization. Physical spaces, such as the "talk rooms" in some Japanese firms that foster work-related or random discussions among individuals (Davenport & Prusak, 1998), are critical to sensemaking and the creation of social networks. While it may not always be feasible to set aside space designated just for informal exchanges, organizations interested in advancing their knowledge practices

will benefit from considering the role of shared spaces in enabling storytelling and conversations.

5.3 Encouraging Storytelling and Conversations in Virtual and Global Organizations

Individuals in organizations today are increasingly connected through virtual networks, facilitated by advances in information and communication technologies. Work that once centered on all employees sharing the same physical space has now evolved to individuals being located in multiple locations not just within one country but across the globe. In addition, work practices such as telecommuting have ensured that physical proximity is no longer a taken-for-granted work practice. While these changes in the workplace have made significant contributions to advancing the needs and goals of individuals and organizations, they have eroded somewhat the spaces for human interactions such as storytelling and conversations. Empirical evidence suggests that individuals are more likely to engage in knowledge sharing interactions if they have strong informal relationships with their colleagues, often developed through physical proximity (Monge et al. 1985). In addition, physical proximity creates shared language and shared culture, which in turn facilitates effective knowledge exchanges (Davenport & Prusak, 1998). Weick (1997) added that information exchanges using electronic formats, while expediting data sharing, inadequately communicate the meaning embedded in the information. This inability to create shared understandings is especially significant when electronic means are used for conversations and storytelling.

Stories stored in databases often tend to be inert (Linde, 2001), discouraging enjoyment, repetition and recall, ultimately ceasing to add value to the organization. Stories lose much of their context and flair when removed from the storyteller. The act of narrating a story to an audience by itself can be considered a network creating, knowledge activity in organizations. So, when stripped of its context and the human touch of the storyteller, stories often lose their impact. Solutions such as virtual chat rooms and communities have ameliorated some of the disadvantages of geographic distances, creating virtual *ba* in many organizations. Yet, informal face-to-face interactions are still the most critical means by which knowledge is created, shared and applied in the workplace (Brown & Duguid, 1991; Davenport & Prusak, 1998; Nahapiet & Ghoshal, 1998; Rulke & Zaheer, 1999). Therefore, while technologies that facilitate knowledge processes in organizations should be embraced, they should also be examined to understand if and how they support narratives such as conversations and storytelling.

Storytelling and conversations make a substantial contribution to sensemaking and the creation of social webs in organizations even though they are often taken-for-granted within knowledge contexts. If organizations are to take advantage of the potential of these narratives, they need to examine these natural processes more closely to see how they can be enabled

in organizational environments. Organizations can look at the design of work, workspaces and communications in virtual and global organizations to identify means of encouraging and facilitating narratives. As advances are made in understanding knowledge and knowledge processes, it is imperative that researchers and practitioners consider the role of narratives and examine their contribution to the creation, transmission and application of knowledge in organizations.

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Consumer Knowledge, Social Sensemaking and Negotiated Brand Identity:

The Not-So-Simple Place of Consumer Communities in Management Studies

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Abstract: Strong consumer brands have shifted, lately, from a traditional—advertising-based—way of communicating with consumers to a more interactive and networked approach, which often include relevant investments in a brand community.

A brand community is described in the literature as "a specialized, non-geographically bound community, based on a structured set of social relations among admirers of a brand." These communities play a relevant role in building a stronger bond between brands and consumers, so that the affective ties tend to transform in advocative consumer behavior and loyal relationships. But brand communities can also provide a number of valuable learning opportunities for both customers and the organizations that sponsor them. This paper wants to explore the process through which these learning objectives are met, and the social level variables that influence the nature and the evolution of this process.

1 Introduction

This paper's goal is to address the issue of customers' involvement in organizations, through consumer communities. This phenomenon has been addressed in the literature on knowledge management and innovation management (within the narrative on communities of practice), and more recently in the literature in marketing (focused on brand communities). We argue that a more integrated and communication-based research agenda should be developed, so to uncover the complex interlink between these two processes (learning and brand building) in consumer communities, but also how they participate in the socio-cognitive and narrative constitution of the new complex organizations.

2 The Changing Landscape of Post-Fordist Markets and the New Management Challenges

Global and networked economies create complex markets. On these fast-changing economic landscapes, competitive advantages of firms are based more on innovation than on sustainability (Christensen, 1998; Brown and Eisenhardt, 1997). With this respect the network of relationships of a firm, beyond its traditional organizational boundaries has become a critical source of strategic capabilities and advantages (Powell, Koput, Smith-Doherr, 1996; Dyer and Nobeoka, 2000).

Innovation is conceptualized as an activity of production and integration of new knowledge incorporated in the organizations' core competences (Henderson and Clark, 1990; Henderson and Cockburn, 1994). Beyond the neo-classical narrative on markets, the System Innovation approach (Edquist et al., 1998; Malerba et al., 1999) considers innovation in markets as an interactive learning process. To sustain continuous innovation firms create continuous knowledge and relationships that can support this cognitive and social dynamics and co-evolution (Vicari, 2001). The well-known study of Clark e Fujimoto (1991) on innovation in the automotive industry highlights the role of specialist/technical knowledge in the innovation process but also the understanding of what is important for the customer, so that technical and market knowledge can combine in a successful new product.

Adaptation cannot be based on organizations seen as isolated units of activities and learning. Adaptation must turn into co-adaptation, because - in order to sustain increased levels of complexity - firms seek help from outside their boundaries (Cohen and Levinthal, 1990). Knowledge creation becomes an inter-organizational and network enterprise (Dosi and Malerba, 1996; Powell, Koput, Smith-Doherr, 1996; Arora and Gambardella, 1990). Organizations becomes complex learning networks (Vicari, 2001), and considering the interconnectedness of these enterprises" ... a new management model should describe the nature of the relationships between the individual and the organization and between the organization and the environment" (van Krogh and Roos, 1995, p. 80).

Also, marketing is faced by new needs for market knowledge and relationships in these new interconnected markets. Market research shows its limits (Reed and Bolton, 2005), and for marketing communication the creation of branded links between products and consumers is becoming an increasingly complex task (Christensen et al., 2005). In post-Fordist economies the market is too complex to be addressed with traditional communication tools informed by the need for predictability. "Rather than imposing a monological and hegemonic identity on markets and organizations - an identity that will unavoidably be challenged by consumers and employees - contemporary marketers and managers need to realize that organizational change and adaptability presuppose openness to variety, difference and polyphony ... Along with tolerance

toward variety, organizations need to develop a tolerance for meanings nego-tiated together with consumer communities, such as brand communities, in the market." (Christensen et al., 2005).

3 Customer's Involvement in Organizations

Recently there has been an upsurge in interest, among academics and practitioners, in the notion of customer involvement in organizations. Firms see it as a way to achieve efficiency in product development (Rothwell, 1994) and to reduce uncertainty in the innovation process (Leonard-Barton, 1995). This logic is best highlighted by Thomke and von Hippel (2002), who see product development process as difficult because the "need" information (what the customer wants) resides with the customer, and the "solution" information (how to satisfy those needs) lies with the manufacturer. Conceptualizing customers' involvement in organizations, Nambisan (2002) describes the role of customers in both the upper and the lower stream of the supply chain, as input and output, classifying the three customers' roles of resource, co-producer, and user.

Customers can be seen as new sources of valuable knowledge for the company (Prahalad and Ramaswamy, 2000). The involvement of customers in innovation project development has been depicted as the new frontier of learning and creativity in innovation management (Gales and Mansour-Cole, 1995; Nambisan, 2002). Intimate relationships between firms and their customers are considered the necessary platforms for exploiting this innovation potential (Wikström, 1995; Kaulio, 1998; Neale and Corkindale, 1998; Von Hippel, 1986). Customer-oriented companies have started to get closer to consumers, in order to be able to get in touch with the real and individual persons, behind the market research data (Davenport et al., 2001). By interacting with customers and taking part in activities with them, firms generate relevant knowledge (Ramirez, 1999; Nambisan, 2002).

New management and marketing theories propose a new active role of consumers in the post-Fordist markets, with the notion of Value Constellation proposed by Norman & Ramirez (1993), Value Co-production proposed by Ramirez (1999), and Co-creation of Prahalad & Ramaswamy (2002). With this approach customers are considered included in the value net (Parolini, 1999), with their value expectations but also with their value creation capabilities. The new organizations are designed with their overlapping borderlines between suppliers and customers (Prahalad & Ramaswamy, 2002).

In the development project of Volvo Cars' first Sports Utility Vehicle (SUV), the XC90, a group of Southern Californian female customers met with the project management team throughout the development process (three year project), and this interaction had a great impact on the XC90 project. "The approach to customer involvement [was] . . . radical. The project management

team was willing to experiment by setting up meetings with the Southern Californian women. Based on this approach, co-development has taken place, as the project management team and female group were intimately involved in an integrated development project, where both parties contributed with their expertise. Both actual customer and a shared customer understanding were brought into the project in a distinct way" (Dahlsten, 2004). These meetings can be conceptualized as communities of practice since managers and consumers meet to co-generate ideas about the new product.

This approach to customers' relations radically departs from the traditional marketing perspective, as it bases firms' competitive position on their ability to understand and serve their customers with a relationship and value-based approach (Lemon et al., 2001; Urban, 2003). It's not anymore a matter of optimizing the value chain; the value chain becomes a "value network" (Parolini, 1999). "Customer involvement implies a different approach to value creation in a project. It is different from the traditional value-chain view in that co-production considers value creation as synchronic and interactive, not linear and transitive (Ramirez, 1999). With the customer as co-producer, the interaction between the parties should generate more value than a traditional transaction process. The interaction implies a longer relationship, a refined role distribution and the possibility to acquire more knowledge (Wikström, 1995)" (Dahlsten, 2004). Co-development is a process in which both manufacturers and consumers contribute their expertise (Neale and Corkindale, 1998). It is a "collaborative view" of the relationships between manufacturers and customers that, beyond the traditional marketing-mix approach, in the past was considered typical of business markets (Hakansson and Snehota, 1995), and only recently we have learned to apply also to consumer markets (Mandelli, 1997 and 1998).

Literature on strategy, organization, and product development all emphasize the importance of customers in the innovation processes. Special mention deserves to be given to the "Customer as Innovator" perspective, proposed by Gales and Mansour-Cole, 1995; Finch, 1999; Prahalad & Ramaswamy, 2000; Thomke & von Hippel (2002); Nambisan (2002), with the idea that absorbing consumer knowledge is important for firm strategy and advantage. The special value of the knowledge "absorbed" (using the notion of "absorbtive capability" proposed by Cohen and Levinthal, 1990) from customers—in this perspective—comes from the possibility of combining it with the dynamic capabilities of the firms, their creativity and product development potential (Powell, Koput, Smith-Doherr,1996). This need for dynamicity makes the process of this knowledge creation critical and strategic.

Not everybody agrees that customers should always be considered a valuable source of knowledge. Christensen (1998) contends that there is an irresolvable tension between customer focus and innovation. Customers might not be reliable predictors of their own long-term buying behavior in the case of disruptive technologies. Customer involvement in radical innovative markets can lead to an overemphasis on minor modifications and conservative NPD

decision-making. According to Slater and Narver (1998), there is, however, a difference between being customer-led and being truly market-oriented. Being market-oriented represents a long-term commitment to understand customer needs - both expressed and latent - and to develop innovative solutions that produce superior customer value. In order to exploit this potential it is not sufficient to "study the customer." Firms must enrich the relational fabric of their link to customers and invest in inter-consumer relationships. This research program is consistent with the idea of learning organizations (Senge 1990; Edquist et al., 1998), which seeks to entitle organizations with the role of creating the bases for adaptation, in complex markets, through learning. Knowledge, in this approach, is seen as the engine for evolution. Organizational learning is described as an emergent, trial-and-error process (Mintzberg, 1996a, 1996b; Rumelt, 1996), "situated" in specific and culturally bounded social settings (Lave and Wenger, 1991; Brown and Duguid, 1991). When urged to delineate the forms of this learning organization, often the scholars refer to models of organizing based on the so-called communities of practice (Lave and Wenger, 1991).

4 Beyond the "Active Customer" Approach: Consumer Communities as Communities of Practice

Lave and Wenger (1991) coined the term "Communities of Practice" (CoPs) to refer to groups of people engaged in innovative and organizational processes of learning and change. CoPs are a set of people who "share a concern, a set of problems, or a passion about a topic, who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (Wenger, McDermott & Snyder, 2002, p. 4), but also groups of "people [who] share their experiences and knowledge in free-flowing creative ways so as to foster new approaches to problem-solving and improvement, help drive strategy, transfer best practice, develop professional skills and help [organizations] recruit and retain staff" (Lave and Wenger, 1991, p. 87).

   The community of practice approach starts form the idea that knowledge is not built within a hierarchical system of relationships. As also Luhmann puts it, "the increasing need for specialist knowledge results in subordinates often being more knowledgeable than their superiors ... [and] in addition to their specialised knowledge, subordinates may be independent in other ways, for example their personal dealings with the outside world, which cannot be completely supervised ... the exploitation of this knowledge and of these relations cannot simply be commanded" (Luhmann, 1986, p. 31).

   This notion also rests on our understanding that what we know depends on who we know. This concept is not new. Humanity has always formed communities of practitioners to improve the ability to share relevant knowledge. In the classical world artisans and other professional masters formed "corporations," or communities of practice, to share valuable expertise

(Wenger and Snyder, 2000). Also in the management field, communities of practice are not a recent phenomenon (Cohen et al., 1996); they were initially conceived as quality circles and spread from Japan and the US into Europe, particularly over the last decade, along with globalization and the increase of complexity in the economy.

Communities of practice can be external, made by customers or other external business partners, who are willing to share their expertise on a relevant topic. Customers' involvement in organizations is frequently conceptualized as such (Nambisan, 2002). The biggest problem with the external communities is believed to be the difficulty for organizations of benefiting from this knowledge (Szulanski, 1996), developing relational learning processes and shared narratives for transferring their customers' tacit knowledge, transforming it into customer capital.

According to Mascitelli (2000), breakthrough innovation comes from harnessing tacit knowledge, knowledge that can be transferred by socialization (Nonaka and Takeuchi, 1995). Customer involvement, in this perspective is more a matter of informal knowledge sharing and interactive meaning construction than information transfer (Nambisan, 2002). This is why the learning relationship between the organization and the consumers moves from a one-to-many or one-to-one perspective to a collaborative and community approach (Mandelli, 1998 and 2004). With the diffusion of communication networks, informal grouping of consumers, willing to gather and share knowledge about their consumption experience and expectations in so-called consumer communities, has become a normal pattern of behavior (Porter, 2004). As Nambisan (2002) argues, these new communication channels enable firms to create virtual customer environments that can be leveraged for product development and innovation strategies. Kaulio (1998) makes the following distinction among types of interaction with the customers in product development. "Design for" describes a product development approach where products are designed on behalf of the customer and traditional market research methods are used. In "Design with" the customers can react to different proposed design solutions. "Design by" refers to a product development approach where customers are actively involved in the design of their own product. The sharp distinction between customers and designers ceases to exist. (Nambisan, 2002).

Several studies have analyzed the specific conditions for this new form of firm-customer relationships and the processes involved. But much of this work, even when it has not been influenced by transactional views of organization and business processes and has applied a relational perspectives, has assumed a cognitivist framework to knowledge creation and co-creation (Lundkvist and Yakhlef, 2004). "Implied in this is the assumption that … product or service development is only a matter of finding where the required information is located and of communicating it from where it is to where it should be, using language." (Lundkvist and Yakhlef, 2004, p. 249). From a conversational standpoint, Lundkvist and Yakhlef (2004) have criticized the

account of learning practices, described in much of the literature in innovation studies. In their perspective: "Accounts for customer motivation are mainly couched in psychological, economic-transactional terms (such as self-efficacy, fun, altruism, reputation, reciprocity, etc.) (Davenport and Prusak, 1998; Kollock, 1999; Sawhney and Prandelli, 2000; Nambisan, 2002).... To the extent that motivation is not a form of behaviour, nor a form of action, a conceptualisation of how customer motivation is translated into active participation has remained elusive in much of the literature in the field. It is still dominated by a view of language as mainly concerned with the manipulation of symbols, ideas and knowledge, overlooking its transformative, agential power - a process whereby customers are transformed into active participants, into change agents intervening in the workings of the firm" Lundkvist and Yakhlef (2004, p. 249).

The mainstream approach considers customers' involvement in organizations as an issue of knowledge absorption and re-combination (Cohen and Levinthal, 1990), on one side, and a matter of learning relationships (Kotha, 1996) on the other side. In the model proposed by Nonaka and Takeuchi (1995) it always seems a matter of knowledge transfer and recombination through socialization or externalization. As Heaton and Taylor (2002) convincingly argue from the communication perspective, distinguishing between tacit and explicit knowledge is not sufficient. They write: "When Karl Weick (1979) asks, 'How can I know what I think until I see what I say?' he is dealing with a general communicational principle that applies to all organizations. It is also what Durkheim was getting at. To deal with a very complex environment, we humans put together organizations in which many, many people's individual contributions fit together to realize great enterprises. But each of those people is linked into his or her particular part of the world in a special way. Like a connectionist net, they learn to link their respective actions into a network that is adapted to their local circumstances, even though within the larger organization the complexity of this local adaptation becomes ... invisible" (Heaton and Taylor, 2002). Organizations are conversations and texts (Taylor and Cooren, 1997; Heaton and Taylor, 2002; Taylor and Robichaud, 2004; Putnam and Cooren, 2004). Organizations also need to know that they are organizations, that they have a common fate and identity, otherwise they will eventually fall apart (Heaton and Taylor, 2002).

From this standpoint organization and marketing managers are called to go beyond the simple equation consumers = innovators. Knowledge is not a black box that we can fill in and transfer or some external resources that we can acquire and absorb. In a communication perspective, consumer communities and their communicative processes become active agents in the "organizations as conversation," with their learning practices, their socialization dynamics but also their social constructive role and power dialectics. In marketing terms this means linking the issue of innovation to the issue of identity and to the issue of brand-consumer dialectics. As Kozinets (2004) shows, if we want to

understand the full complexity of this phenomenon then we need a deeper understanding of the dynamics and complexities of consumer culture.

Behavioristic enquiries (even when attentive to the role of the affective dimension of decision making) are not able to fully address and explain the complex process of sensemaking in these social settings. As Cooren (2004) states "... organizing, as a sense-making activity, implies the development of a collective form of intelligence that cannot be reduced to the sum of the individual contributions" (Cooren, 2004, p. 519). From this perspective, the behavioristic and cognitivist approach to consumer communities of practice lack the possibility of uncovering the strategic relationships between the new boundaryless organizational practices and the dynamics and performance of these new business entities.

Here the problem is a matter of a relationship between knowledge and sensemaking, but also a matter of understanding how the process of knowledge building is related to identity construction. Communication scholars contend that these two terms cannot be separated (Taylor, 1999). "Organizations ... need to know that they are organizations - that they form a community of people united by a common fate. Otherwise, if the community itself has no identity to the people who make it up, it will eventually fall apart. Thus, this means that what the community knows, as a community, must somehow be given a voice so that it can, in Weick's (1979) words, 'know what it knows because it sees what it says.' And that means voicing the network's practical knowledge discursively, to make it intelligible to the community as a whole" (Taylor, 1999). It is through narratives and narrativity that we come to know and make sense of our social world, and it is through narratives that we constitute our social identity (Somers, 1998). This conversational and discursive nature of knowledge and identity return to be strategic also when we address the issue of consumer communities, from the marketing perspective, as brand communities.

5 Consumer Communities as Brand Communities

The role of brand and brand symbols in consumer culture and behavior has changed quite substantially in the last decades, as well as our understanding of the complexity of consumption (Bloch et al., 1984; McCracken, 1986; Belk, 1989; Belk et al., 1989; Carr, 1996; Escalas and Bettman, 2003; Bhattacharya and Sankar, 2003; Venkatesh, 1999; Thomson et al., 2005; Arnauld and Thompson, 2005). Consumers are not seen anymore as rational decision makers. They subjectively and socially construct their consumption experiences. "Consumer behaviors vary across time and space as well as by contingencies and changing images. In a world filled with choices, there are no sustaining themes or consumption patterns. ... the consumer sets

no discernible patterns and engages in multiple experiences. These experiences become narratives of one sort or another ... Once we employ the term *narrative*, we enter the world of language, in particular the language of signs, and move away from objective representational schemes." (Venkatesh, 1999, p. 155)

Consumers buy symbols, along with products; consumers value brands and product for what they bring to their social life. Brands become cultural icons, symbols of sets of ideas and values (Holt, 2004). Brands become vessels for self-expression. Marketing scholars have started to explore "... how consumers actively rework and transform symbolic meanings encoded in advertisements, brands, retail settings, or material goods to manifest their particular personal and social circumstances and further their identity and lifestyle goals. ... From this perspective, the marketplace provides consumers with an expansive and heterogeneous palette of resources from which to construct individual and collective identities." (Arnould and Thompson, 2005, p. 873)

With the diffusion of the Internet, virtual communities have started to be considered as a way to facilitate stronger relationships between firms and their customers (Barnatt, 1998; Brown, Tilton, & Woodside, 2002; Hagel & Armstrong, 1997; Bagozzi & Dholakia, 2002; Dholakia, Bagozzi & Pearo, 2004). The attachment to the community predicts user loyalty (Mathwick, 2002), with all the business implications of this loyalty (Bhattacharya, Rao, and Glynn, 1995; Reicheld and Sasser 1990).

Firms can benefit from launching or entering in relationships with existing consumer communities to fulfill business goals: increased sales, positive word-of-mouth, more effective market segmentation, increased website traffic, stronger brands; higher advertising and transaction fee revenue; better product support and service delivery (Porter, 2004). These communities are not all the same. As Porter (2004) explains: "most researchers have focused on member-initiated communities ... and member-generated content ..., rather than on virtual communities that are sponsored by organizations. These types of virtual communities are increasing in popularity among firms."

A brand community is defined by Muniz and O'Guinn (2001) as "A specialized, non-geographically bound community, based on a structured set of social relationships among admirers of a brand" (Muniz and O'Guinn, 2001, p. 412). Bagozzi and Dholakia (2001) propose to distinguish between small groups and networks to conceptualize brand communities. Using the classification scheme proposed by Bagozzi and Dholakia (2001—see Table 1) it becomes easier to highlight the differences between brand communities and what we used to define as subcultures of consumption, but also to separate different forms of brand communities.

Small-group-based brand communities (e.g., Harley Owners Group) have socially close relationships among members, high group interaction, and a focus on relationships within the group. Networked-based community

Table 1. Three Forms of Intentional Social Action in Consumer Behavior

	Subcultures of consumption	Brand Communities Network-based	Small group-based
Definition	"A distinctive subgroup of societyat self-selects on the basis of a shared commitment to a particular product class, brand, or consumption activity" (Schouten and McAlexander 1995, p. 43).	"A specialized, non-geographically bound community, based on a structured set of social relationships among admirers of a brand" (Muniz and O'Guinn 2001, p. 412).	A group of consumers with a consciously shared social identity, whose members act jointly in group actions to accomplish group goals and/or express mutual sentiments and commitments.
Primary focus	Relationship of an individual consumer to a brand, expressed idiosyncratically via identification with the brand and in a sense of personal spirituality nd the holding of unique values. The individuals comprising the subculture hold more or less common personal identities but do not share a social identity and do not express their identities as part of a network or group. Individuality and self-transformation are paramount.	Network of relationships among consumers, organized around a brand and promoted typically via such non-face-to-face means as web-based virtual communities (e.g., chat groups), where intellectual and utilitarian support are primary, emotional support secondary.	Face-to-face interactions in small groups, where brand-related activities intermingle with other social activities and emotional support among members is central.
	Egocentric	Weakly to moderately sociocentric	Strongly sociocentric

Table 1. (continued)

	Subcultures of consumption	Brand Communities Network-based	Small group-based
Role of psychological variables (e.g., attitudes toward brand, emotional attachment to brand, personal identity)	Very strong	Moderate	Strong
Role of social variables Self-awareness of membership in subculture or brand community	Low	Moderate to high	High
Affective commitment to subculture or brand community	Low	Moderate	High
Evaluative significance of membership in subculture or brand community	Low	Moderate	High

(Source: Bagozzi and Dholakia, 2001)

members are geographically and socially dispersed, focus on functional exchanges (information and evaluations) among members, with short-duration relationships (Dholakia et al., 2004). Usually the first type of communities are believed to be business oriented, while the second type are non-profit (Porter, 2004).

Brand communities are becoming popular in consumer marketing since they are believed to be critical for linking brands and consumers, beyond the traditional one-way and hierarchical communication practices based on advertising. Since the beginning of the nineties we can find research efforts in this area: studies of river rafters (Arnould and Price 1993); Harley-Davidson subcultures (Schouten and McAlexander 1995); Harley and Jeep Brandfests (McAlexander et al., 2002); Macintosh, Saab, and Bronco brand communities

(Muniz and O'Guinn 2001); groups of in-line skaters (Cova,1997); and a Winnebago travelers' club (Peters and Grossbart 2001). Most of the brand communities observed for academic research bring very different benefits to firms: valuable knowledge for new product development and loyal branded relationships in the first place.

As McAlexander et al. (2002) state:

> Differentiating on the basis of ownership experience can be achieved through programs strategically designed to enhance customer-centered relationships .... The benefits to a firm of cultivating brand community are many and diverse. Community-integrated customers serve as brand missionaries, carrying the marketing message into other communities. They are more forgiving than others of product failures or lapses of service quality .... They are less apt to switch brands, even when confronted with superior performance by competing products. They are motivated to provide feedback to corporate ears. They constitute a strong market for licensed products and brand extensions. In many cases, we even find loyal customers making long-term investments in a company's stock. Customers who are highly integrated in the brand community are emotionally invested in the welfare of the company and desire to contribute to its success.

Studying the communities built around the brands of Ford Bronco, Macintosh, and Saab, Muniz and O'Guinn (2001), emphasize relational and social processes in brand communities, that distinguish them from individual-centered subcultures, even if they admit certain similarities (e.g., shared ethos, acculturation patterns, status hierarchies) with the subcultures of consumption, brand communities exhibit the traditional characteristics of community (shared consciousness, rituals and tradition, and a sense of moral responsibility).

Consciousness of kind or "we-ness" is the strong connection that members feel toward one another beyond geographic limits, a sense of belonging, a social identity and a collective sense of difference from others not in the community. This sense of difference and oppositional brand loyalty, stemming from a sense of "legitimacy of cause," builds what the brand is and what the brand is not, along with what the members are and are not. This socially negotiated meaning of the brand is strictly interlinked with knowledge of the product, since members of the community differentiate between true members and the others by "really knowing" the brand (Muniz and O'Guinn, 2001) and therefore also the product.

For Muniz and O'Guinn (2001) rituals and traditions represent "vital social processes by which the meaning of the community is reproduced and transmitted within and beyond the community." They usually are centered on shared consumption experiences with the brand and social narratives. "Storytelling is an important means of creating and maintaining community. Stories based on common experiences with the brand serve to invest the brand with meaning, and meaningfully link community member to community

member" (Muniz and O'Guinn, 2001). This social narrative include the institution that owns and manage the brand, since brand stories sometimes emanate from commercial texts and advertising. From these stories consumers negotiate brand identity, often including adversarial nuances and challenges to the firm's sense of ownership on the brand (Kozinets, 2004). This becomes more clear from the description of Saab and Apple communities by Muniz and O'Guinn (2001):

> Saab drivers like to discuss Saab ads that make the link between Saab airplanes and cars. Apple members like to use the phrase "For the Rest of Us," ad copy from the introductory campaign for the Apple Macintosh. This ad copy also ends up being part of the lingua franca of the brand community. Brand community members negotiate communal interpretation, further blurring the perhaps illusory line between writer (marketer) and reader (consumer). Brand community members are aware that these brands are made by corporations. At one level this is obvious, and at another deserves some further reflection. In the case of both Saab and Apple brand communities, corporate identity and ethos matter. With Saab, members feel that a more pure, even pristine, small Swedish company with a good consumer ethic was being taken over by a big American corporation (GM) known for its bigness and, in their view, incompetence and poor consumer ethic. In reaction, some brand community members spin out myths regarding how they think GM is largely "leaving Saab alone," but were still uneasy about it. The phrase "pre-GM Saab" is common, as is a communal nostalgia. Similarly, Apple community members celebrate their anti-establishment roots. Most see John Scully's resignation as CEO as what led Apple astray: "the guy was way too corporate, he wasn't Apple." The preservation of what the brand is and stands for is important to the brand community. Members often feel that they have a better understanding of the brand than the manufacturer does. In fact, brand community members feel that the brand belongs to them as much as it does to the manufacturer.

Communities are also characterized by shared moral responsibility, that is a sense of duty to the community as a whole, and to individual members of the community. These sentiments contribute to group cohesion and coordination. They also are at the basis of the learning practices of these communities, since it drives inter-consumer assistance. "One of the ways this assistance manifests itself is through actions to help fellow community members repair the product or solve problems with it, particularly involving specialized knowledge acquired through several years of using the brand. ... In the Saab and Bronco brand communities, some of the assistance community members provide to one another includes information on recommended dealerships and parts suppliers, as well as sources for technical information. In some ways, the information provided by brand communities is more useful to consumers than information

provided by marketers due to the lack of commercial self-interest. This again represents a blurring of the marketer-consumer role boundary" (Muniz and O'Guinn, 2001).

Beyond a rigid classification of consumer communities (Porter, 2004), the for-profit and the private dimensions of these social gatherings seem to blur (Muniz and O'Guinn, 2001; Mandelli, 2004). Muniz and O'Guinn (2001) described the symbolic complexity of the brand community: "Like other communities, it is marked by a shared consciousness, rituals and traditions, and a sense of moral responsibility. Each of these qualities is, however, situated within a commercial and mass-mediated ethos, and has its own particular expression. Brand communities are participants in the brand's larger social construction and play a vital role in the brand's ultimate legacy." (Muniz and O'Guinn, 2001, p. 412)

This integration between the utilitaristic and the emotional dimensions of life are characteristic of these environments: "Through communities, people share essential resources that may be cognitive, emotional, or material in nature. Among all the things that may or may not be shared within any given community-things such as food and drink, useful information, and moral support-one thing seems always to be shared: the creation and negotiation of meaning" (McAlexander et al., 2002).

In the Ducati brand community, hosted on the Ducati institutional website, the Ducatisti (the Ducati motorbike fans), exchange information about where to find mechanical parts for their bikes, but also discuss about what they think of the Ducati bikes' performance in the races and championships, or plan trips and search for fellows (Table 2) (Mandelli, 2004).

Table 2. List of Topics Discussed in the Ducati Brand Community

COMMUNITY ACTIVITIES

1 Product information requests
2 Buyers searching for advice
3 Exchange of advices on motorbike maintenance
4 Comparisons of different brands
5 Mototrip planning (fellows searching, advice on possible itineraries, travel reports, etc.)
6 Buying and selling spare parts and second hand bikes
7 Information on old models, history of the company and value of collectible items
8 Organization of rallies and promotion of the main initiatives of Ducatisti clubs
9 Attitudes toward corporate policies (opinions on management decisions, commercial policies, new models etc.)
10 Discussions about sport competitions, the racing team and pilots performance.

(Source: Mandelli, 2004)

Ducatisti feel they are part of the "Ducati world" even when they do not own a Ducati bike and are sure they will never afford to own one in the future. They ARE the "Ducati world" because they build the rituals and the symbols around which the Ducati brand is constituted.

Creation of social meaning is, indeed, the core of the new relationship between firms and consumers, since in these communities the "... primary bases of identification are either brands or consumption activities, that is, whose meaningfulness is negotiated through the symbolism of the marketplace" (McAlexander et al., 2002). Scholars have grappled conceptually and empirically with this contradictory and often conflictual territory of social sensemaking. Consumers construct their life, not only brands, through symbols, and they bring to this brand-centered social sensemaking their history and their values, that are not necessarily consistent with the dominant and commercial narratives (Kozinets, 2004).

This is why McAlexander et al. (2002) suggest to go beyond the vision of the brand community as a customer-customer-brand triad proposed by Muniz and O'Guinn (2001). They suggest to go beyond the construct of brand community as a social aggregation of brand users and their relationships to the brand itself as a repository of meaning, and include the customer-customer-brand triad elemental brand community relationship within a more complex web of relationships: between brand community members and their common culture, their branded possessions and institutions that own and manage the brand. The authors "... take the perspective that brand community is customer-centric, that the existence and meaningfulness of the community inhere in customer experience rather than in the brand around which that experience revolves" (McAlexander et al., 2002).

Communities construct their life and social identity through dynamic processes (Alexander et al., 2001), embedded in rich social contexts. Consumers participate in this symbolic construction, bringing their knowledge and rational expectations but also their individual and social emotions and dreams. When scholars in the marketing field started going more deeply into the study of the motivations for consumers to interact in brand communities, this process has started to become more comprehensible. As Bagozzi and Dholakiawrite: "Much effort in the last five years or so has gone toward creating virtual communities for commercial purposes. Early simplistic thinking of "build and they will come" has given way to a less obtrusive, hands-off "nurture and cultivate" approach—but even here, the focus of marketers has been on keeping the commercial topic (discussion regarding the product) as the underlying focus of the community. ... such an emphasis may be somewhat myopic and misdirected. The group, not the product must be the object of nurturance, for virtual community builders" (Bagozzi and Dholakia, 2002, p. 18).

Even though it is certain that brand communities can create very valuable product-related knowledge for the organizations that nurture these communities, in these complex social settings processes of social identification

and brand symbolism are not separable from the knowledge dimension related to the product. Information exchanges and new ideas don't stem from an interest in the product itself but from an interest in the group and its symbols and rituals. Communities have an active interpretive function, transforming brand identity in a socially negotiated group identity, since "online consumers are much more active, participative, resistant, activist, loquacious, social and communitarian than they have previously been thought to be" (Kozinets, 1999, p. 261).

Another important result coming from Bagozzi and Dholakia's (2002) and McAlexander et al. (2002) is that brand communities are not homogeneous monolithic organisms; they are multifaceted bodies, made by many different small groups and identities. Even when participating in very large communities, people interact with very few people on a regular basis. And "... the allure of these virtual communities for these participants lies in the benefits of social interaction with a small circle of friends. They develop identification with this small group, allowing group norms to form through processes of identification" Bagozzi and Dholakia's (2002).

This is very consistent with Cova's (1997) assertion that "the link is more important than the thing" (p. 307). In Cova's description, post-Fordist consumer markets are made by tribes, networks "... of heterogeneous persons in terms of age, sex, income, etc. - who are linked by a shared passion or emotion; a tribe is capable of collective action, its members are not simple consumers, they are also advocates." A tribe is not necessary a brand community, since its members are not necessarily connected around a specific brand. In Cova and Cova's (2002) account, "society resembles a network of societal micro-groups, in which individuals share strong emotional links, a common subculture, a vision of life. In our times, these micro-groups develop their own complexes of meanings and symbols and form more or less stable tribes, which are invisible to the categories of sociology." These tribes challenge the traditional notions of markets, consumption and brands, since their members can be commercially targeted only through community-based value-propositions, not products. Products have value only for their linking potential and their meaning. "In fact, the (re)construction or (re)possession of meanings through shared experiences and their enactment through rituals is the most potent form of maintaining tribal identity in our postmodern societies" (Cova and Cova, 2002).

6 From Brand to Knowledge; From Knowledge to Brand

The phenomenon of consumer communities has been studied from different perspectives: organizational innovation studies, marketing and the sociology of consumption. These perspectives have highlighted the relevance of these new forms of consumer activities and socialization for management studies. Customers' involvement in organizations, if it is based on inter-consumers' rich

social interactions, can help build differentiation and sustainable competitive advantage, through learning and brand-based processes.

These research efforts have worked mainly on specific benefits that firms can extract from these communities: knowledge in the first case and brand equity for the latter studies. Innovation studies are not very interested in product brand identity and brand management scholars are not very interested in learning processes. All these studies have insisted on the importance of social relationships and the social construction of meaning among members, but they concentrated mainly on these social and symbolic processes as "pre-requisite for something" (knowledge in the first case, brand identity and loyalty in the other studies). From this perspective consumer communities can be included in the organization (with their valuable knowledge and brand passion) if consumers are motivated, and this motivation comes from the social relationships they can establish in these communities.

We think, instead, that communication and meaning in these communities ARE exactly what the researchers are looking for; they are both knowledge and brand. This is why it doesn't seem correct to study learning and brand building processes separately. For understanding and designing management activities for the involvement of consumer communities in organizations, we need an integrated communication-based approach. Knowledge is conversation and sensemaking (Weick, 1995; Taylor, 1999; Putnam and Cooren, 2004). Social identity is generated from communication. social identity influences expectations and new ideas about the products and the brand.

In Dahlsten's (2004) rich account of female customers' involvement in the design of XC90 we read:

> The XC90 customer involvement is characterised by an informal quest for understanding rather than capturing data in a structured way. The meetings were socially-oriented rather than task-oriented. The richness of understanding arrived at might suggest that more than explicit knowledge was transferred. That tacit knowledge is transferred through a process of socialisation was applicable for the female customer group project, leading to a notion of tacit design by customer presence. The importance of peace and quiet in the car, the fear of being perceived as intimidating when driving an SUV or the independence of female decision-making about cars would not have been co-opted by a series of focus-group meetings without real interaction (Dahlsten, 2004).

It becomes clear that information about what was important for these customers was generated in a rich social interaction context, but also that this communication environment could influence what people could feel and say about the product. Continuing with the XC90 story:

> Meetings were informal and did not put pressure on the female group. With a project context encouraging curiosity about customers, the

project managers could form a relationship with the female group, leading to mutual respect between the groups. In the relationship established, the customer group did not feel like female customers only, but rather as successful affluent professional women who shared their lifestyles as much as their specific views on cars (Dahlsten, 2004).

But this learning process transformed into brand identity building when the product was commercially launched in the market.

The way the product is viewed within the project was affected due to the interaction with the female customer group and this view also spread to the media during launch, thus influencing how the XC90 is currently perceived and positioned in the market. The value proposition of the XC90 thus has been changed by the female customer group interaction and this has been done by a customer involvement approach that has been pragmatic, informal and cost-effective, yet continuous and intense. The customer group did not give directions or create a wealth of ideas, but instead affected the project management team by their presence (Dahlsten, 2004).

Studying communities of practice internal to the organization, researchers had already met the issue of how identity plays a role in learning processes. In Contu and Willmott's (2003) critique to Orr 's (1996) analysis of Xerox repair technicians we understand that knowledge creation was embedded in a more complex process of identification, but also in power relationships.

Reflection on the willingness of technicians to learn about the machines suggests that their practices were inspired as much, and arguably more, by an impulse to demonstrate and reproduce their identity as heroic troubleshooters ... these workers developed and embraced a technically oriented narrative of heroic troubleshooters rather than a client-centered narrative of customer satisfaction. ... From their investment in this talk, the technicians derived a sense of identity and self-esteem sufficient to counter and discredit demands that they dutifully follow the company's diagnostic procedures. Perversely, perhaps, this investment operated to fulfil, rather than impede, the objective of keeping customers happy by repairing machines effectively (Contu and Willmott's, 2003.)

It seems that by conceptualizing these practices as coincident with processes of identity formation and identity struggles we can better understand the dynamics of organizational knowledge building. This should holds also for external communities, like consumer communities. As Reed and Bolton write: "Put simply, wearing a hat alters a person's viewpoint, affecting how he sees himself, others and the world around him. And each hat worn does so in its own way. Who the customer is dominates what the product is" (Reed and Bolton, 2005, p. 18 and 19).

These last accounts come from studies in the innovation management field, but the same interlink between learning and identity processes can be easily found in studies on brand communities. Passion for the brand drives socialization processes; socialization create new knowledge and ideas; new knowledge and ideas create new brand identity.

In the Ducati community case, consumers exchange information and opinions about Ducati bikes, because they love Ducati. They feel that Ducati is an important part of their life. They share a brand passion but also the willingness to collaborate with the Ducati firm for improving their image and products (Mandelli, 2004).

> The participatory dimension of www.ducati.com, becomes clear inside the discussion forum area. The access page to the forum reached already in the first year of activity a relevant size of traffic (almost 12000 visits in February 2000). In March 2001, from that page, it was possible to reach several discussion areas, in which there were published several thousands messages (more than 1000 in the main forum, almost 600 in the "Travel" and "Club" forum). The discussion among the Ducatisti paralleled Ducati life events. They focused on new bike models, the abandoning of the races by Carl Fogarty, Ducati choice between WSB or GP championship, etc . . .

The conversation that takes place in the Ducati community is strictly intertwined with the institutional brand communication. Internal and external life of the organization blur.

> Many discussion groups were launched directly by the company, with the goal to animate discussions, keep stronger connections with customers and Ducati fans, give information about new features, provide services, etc.. In some cases, the discussions lasted not for long, as the discussion that took place in October between the Ducati Motor Human Resources Office and some Ducatist looking for a job (133 messages in 5 days). The success of the participatory features of the website was not due only to the special kind of relationship between Ducatisti and the Ducati brand (cultivated by the company), but also to the ability of Ducati.com to invest in content and community management (Mandelli, 2004).

Knowledge and identity emerge from a complex dialectics between consumer narratives and corporate communication. How this organizational dialectics (between centrally coordinated communication and the self-organizing processes of the periphery) works seems to be a very relevant management issue if we want to address the problem of how the boundaryless complex organizations of the future will work, and it should be high on the research agenda.

7 Conclusion

Customers' involvement in organization is a strategic new frontier of management, in times of radical changes in how markets and organizations work. We have surveyed the recent and relevant literature in this area from innovation and marketing studies. Innovation management studies have made clear that customers' involvement in organization can bring relevant benefits to firms in terms of valuable knowledge for new product development. Marketing scholars have explored how firms can develop rich relationships with consumers who are passionate toward their brands and products, creating new loyal ties with present and future customers.

All these studies have highlighted the importance of socialization processes among consumers, and between consumers and organizational actors, in order for firms to achieve the expected benefits. This is why consumer communities (often in the form of brand communities) have been increasingly considered a strategic phenomenon for organizations, from different fields of management studies. It is suggested that firms would want to enter into rich and relaxed relationships with these informal groups of consumers, if they want to reach their learning and brand-based goals.

The application of these principles has, though, highlighted how difficult it is to establish these bridges between the internal and the external organization. Some of these problems can arise from the approach used to conceptualize consumer communities of practice. Knowledge is often conceived as something to be "acquired," "absorbed" or "accessed." Collaborative brands are often considered as negotiated extensions of advertising-based product identities. There may be a main fallacy in the approach applied in the mainstream research on this phenomenon. Language and communication are often conceptualized using a "transportation" metaphor, while in communication studies we have since long understood that communication is a "ritual" construction of reality (Carey, 1989).

In reviewing these research efforts, from the standpoint of communication studies, we have built the idea, though, that there cannot be knowledge without identity and identity without knowledge. Rituals construct both knowledge and identity. The studies that in both fields (innovation management and marketing) are applying an ethnographic and conversational perspective (Kozinets, 2004; Cova and Cova, 2002; Lundkvist and Yakhlef, 2004) are showing how richer can be our understanding, if we study consumer communities as part of the organizational conversation. But we contend that by leaving these efforts on separate grounds (one focused on knowledge and one interested in branding), we are still missing a valuable point.

From the research results reported by these studies, carried out in different disciplines, we build the hypothesis that we will produce a better understanding of consumer communities, and how we can include them in organization management, if we take an inter-disciplinary, communication-based approach. If we think of an organizations as "intersecting networks

of conversations" (Maturana, 1997, p. 61), knowledge is not something that can be "absorbed" from somebody (consumers in our case); rather, it is a symbolic complex composed of interactive constructions of meaning. Without understanding what constitutes social identity in what we can still call the "external part of the organization" and how it links to practices and communication in the "internal" organization, firms cannot explore collaborative knowledge building with their customers. But also, collaborative branding cannot be built apart from this dynamic process of learning. Identity builds on symbols and narratives. Consumer knowledge and collaborative brands are the products of the same process, a process that we call communication.

In conclusion we would like to suggest a deeper exploration of this interlink between knowledge and brand identity in consumers' involvement in organizations. A research agenda on this issue should include a richer understanding of the role of communication in constituting organizations, and the application of this new conceptual framework to the empirical study of consumer communities. If organizations are conversations, then consumers are part of this interactive construction of knowledge and meaning. But also, this conversation constitutes both knowledge and brand. Researchers who apply communication-based perspectives to customer's involvement in organization have started to uncover the complex fabric of this learning process. What we suggest is to go further in this direction, recombining our interest in knowledge-generating processes with our exploration of how we can conceptualize and manage collaborative branding. In the new boundary less organizations, consumer knowledge AND collaborative brand (negotiated product identity) are different facets of the same coin.

We think that a robust research agenda in this area should build on the work developed in social psychology of organizations by Karl Weick (Weick, 1979, 1985; 1995; Daft and Weick, 1984; Weick and Roberts, 1993) and in organizational communication by James Taylor, Linda Putnam, Barbara Czarniawska, D. Robichaud, and Cooren (Taylor, 1999, 2001; Heaton and Taylor, 2002; Taylor and Robichaud, 2004; Robichaud, 1998 and 2001; Robichaud et al., 2004; Czarniawska, 1997; Putnam and Cooren, 2004).

From their work we can get a few important insights about how organizations are constituted and evolve:

1) the idea that practice and action are two sides of the same coin (Weick, 1995; Taylor, 1999);
2) the idea that communication, in the form of social practice and conversation but also texts and narratives, constitutes organization (Weick, 1995; Czarniawska, 1997; Taylor, 1999; Taylor and Robichaud, 2004; Putnam and Cooren, 2004);
3) the idea that complex organizations act as self-organized collective minds (at a subsymbolic level), beyond the explicit consciousness of the individuals (Weick and Roberts, 1993; Taylor, 1999), that brings into the

research scenario the intuitions of communication philosophers (Mead, 1925; Vygotsky, 1978) and evolutionary biologists (Maturana, 1997);
4) the idea that management involves distributed designing as well as inspiration from the top. (Weick, 2003)

From this theoretical platform it becomes easier to address the conceptual and practical problems that we have encountered in dealing with consumer communities:

1) the difficulty in involving customers in radical innovation settings (Christensen, 1998);
2) the troubles we face when we try to understand the complex dialectics between "internal" and "external" narratives on products and brands (Kozinets, 2004);
3) the challenge posed by multiple and adversarial narratives and identities, but also the tension between social and economic goals, in consumer communities (Rifkin, 1998; Kozinets, 2004; Cova and Cova, 2002).

With a communication-based approach we should be able to better understand the complex sensemaking interlink between learning and identity, between knowledge and brand, conceptualizing organizations as social practices, conversations and texts This starting point should also help drive our effort for redefining management principles for customers' involvement in organizations in the post-Fordist economies. It is also likely that we will be able to better address the issue that sociologists of consumption often link to the phenomenon of consumer communities: the social changes produced when the "growing influence" of commercial logics overlaps the social and cultural fabric of community life (First and Venkatesh 1995; Rifkin, 1998).

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Knowledge Processes and Organizational Learning:

A Radical Shift in Management Thinking?

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Abstract: The present chapter discusses the different epistemologies behind different strands of management thinking and calls for the need for further theoretical development. It proposes a specific management methodology, Semiotic Learning, that corresponds to an innovative approach to the field of organizational learning, one that draws on social semiotics and on ontological hermeneutics in order to develop an integrative perspective to the individual and to the social dimensions of organizational learning. Pragmatism stands for the inseparable nature of the individual and the collective aspects of learning. Though many organizational learning theories draw on pragmatism, Semiotic Learning argues for the need to develop further this perspective because once its underlying assumptions are understood its consequences imply a radical shift in relation to dominant management thinking.

1 Introduction

It is possible to describe management as being constituted by a set of functions that are usually performed by specialized departments within organizations. This functionalistic perspective on management is reductive and does not take into account the notion of a complex whole—the whole that is more than the sum of its parts. Some management and organization theories take this complex and holistic (non-functionalistic) perspective. However, the present chapter argues that management practice may benefit from further development of these complexity oriented approaches, namely the ones that enable a better understanding of knowledge processes and of organizational learning phenomena. Central aspects of such approaches are the quality of organizational community life and the organizational meaning-making capacity. These aspects are closely inter-linked, and the present chapter discusses their theoretical assumptions and their practical implications.

This chapter discusses different approaches to the "process" phenomena while analyzing the range of epistemologies that inform and orient different

management schools of thought. It proposes a specific framework to facilitate organizational learning—the Semiotic Learning Framework—that is based on social semiotics and related theories, and that draws on pragmatism in order to analyze the links between individual and organizational learning processes. It is important to note that several contemporary organizational theories follow this pragmatist approach. Pragmatism was developed by C.S. Peirce whose work at the end of the nineteenth century, together with the work of F. de Saussure's, led to the two most influential schools of semiotics during the twentieth century.

Among the above mentioned contemporary organization theory approaches that share a non-dualistic, post-cognitivst and post-structuralist stance, are Stacey's complex responsive processes (2001), Checkland's soft systems methodology (1984, 1999), Eijnatten's chaordic systems thinking (2003), Alvesson and Sköldberg's reflexive methodology (2000), and Weick's organizational sense-making (1995, 2001). Though these are not examples of mainstream dominant management thinking, they reflect the potential for change that already exists in current literature. Therefore, the present chapter argues for the need for a radical change in management thinking and suggests that there already is a high potential for such change to take place.

2 Critical Assumptions—What we Take for Granted

It is important to make explicit what are the underlying assumptions upon which the argument of the present chapter rests. The relevance of this exercise is directly related to the subtle issue being discussed, i.e., what is a "knowledge process" and the set of presuppositions that it implies. Therefore, the following statements refer to that which is assumed as relevant in order to proceed in a discussion on knowledge processes:

(i) It is assumed within the argument of the present chapter that certain aspects, characteristics and mechanisms can be said to be present within individuals and also within collectivities of individuals. Instead of differentiating single from collective entities, the focus is on the *processes* that can be said to be common to both contexts, individual and collective; there is a wide range of theories that support this approach, namely postmodernism and post-structuralism in general, pragmatism (Peirce, 1955), Bakhtin's dialogism (1981; Brandist, 2002), social subjectivity (Lemke, 1995), reflexive methodology (Alvesson, Sköldberg, 2000), and critical psychology (Henriques et al, 1984).

(ii) It is assumed that these mechanisms can be understood as a *creative tension* between two ends of a spectrum, where alternative positions lead to different results so that there is not a single optimum and a state of equilibrium, an ideal result to be achieved, but rather a dynamic and continuous game and negotiation between the two ends, that is, a *developmental process*.

(iii) What was stated in (ii) implies that besides the immediate and objective aims to be achieved, at individual or at organizational level, there are broader objectives that cannot be pinned down and are *constitutively open-ended*. Therefore, besides a reductive and narrow results-oriented approach there is the need for the complementary open-search that is focused on the *process* itself. This focus corresponds to two parallel strands: sense-making and signification activities, and the quality of the relationships and of community life. The importance of sense-making, signification, relationships and of communities derives from (i) where what is individual and single and what is collective and social are mutually and dynamically determined (i.e., it is through their relationships and through being part of real world social communities that individuals perform or undergo their signification and sense-making processes, so that it is simultaneously an individual and a collective enterprise, thus socially determined).

(iv) These three initial assumptions imply a *complexity* approach where there is a *gradual search for understanding* and for integration of the different perspectives and interpretations that become available through the explorations of alternative and complementary, though often contradictory, points of view. The importance of complexity is widely recognized within certain strands of organizational literature (Urry, 2003; Stacey, 2001; Alvesson, Sköldberg, 2000; Prigogine, 1980).

(v) The importance of such an exercise - the *complexity exercise*, the search for understanding through multiple perspectives - derives from (iii) and the continual presence of both an immediate result to be achieved and of an open-ended search for newness. The tension between these two forces is always present and unavoidably so because neither individuals nor communities could survive if only centered in one of the two ends of the spectrum. However, this is often an unconscious process and therefore difficult to assume as being present. It is through the continuous shift between immediate and objective, and long term and open-ended objectives that it is possible to keep the maximum possibilities for development open; it is like an energizing process where both short and long term results can be improved in a synergetic way.

The rationale of the present paper is that bringing forth these links and working on them helps both individuals and organizations to improve themselves. Whether we want to improve performance or simply well-being is irrelevant, because both can be achieved through this rationalization and sense-making activity. We can achieve increased performance with lower well-being only in the short term. If we want sustainable performance and long term results, the two have to be taken together as inseparable, performance and well-being, both at an individual and at an organizational level.

3 The Two Sides of "Process"—The Engineering Versus the Humanities Perspectives

"Process" is one of those words that can have different meanings depending on the context in which it is used. In management thought and practice both sides of the coin are relevant: the engineering perspective, which sees process as a set of structured, pre-determined procedures, and the humanities perspective that focuses on process as an on-going activity that, sometimes, gives rise to a previously planed result.

The tension between these two approaches can be recognized in business settings where both the need to *systematize* (repeat, sameness) and to *innovate* (change, newness) are simultaneously present, so that entrepreneurship and "intrapreneurship" are attitudes to be cherished by innovative managers (Nobre, 2002a). Focusing on organizations as a whole, the notion of organizational effectiveness is also directly related to the balancing of this tension between what has to be repetitive and stable, and that which has to be renewed and restructured (Nobre, 2002b). These do not belong to different spheres of reality, neatly separated, but rather correspond to a dynamic mechanism of interaction that together define the sense making activity of each organization.

Comparing the engineering approach to the humanities approach several distinctions stand out. The engineering approach may be illustrated through the re-engineering, down sizing, and results oriented approaches to management; it is procedural and focused on efficiency and effectiveness; it stresses linear and cause-effect forms of rationality; and it is centered on subject-object relationships. The humanities approach focuses on the notion of process, on non-linear forms of rationality, and on non-causal effects. It is highly sensitive to complexity and to the simultaneous interference of multiple influences; it is open to the existence of paradoxes and to the ambivalence of human contexts; it is not focused on objective and objectionably measurable final results, but on the on-going *processes* that continually produce those partial results; it takes a being-in-the-world approach where the object and the subject cannot be neatly separated.

Looking into the relationship between both approaches it can be said that they correspond to different levels of analysis, they have different purposes and serve different functions. The first one, the procedural orientation, is centered on a system's perspective and takes into account the structural relationships at an horizontal level, focusing on the direct impact of immediate connections. The heart of the re-engineering approach, as well of many previous management perspectives, is the answer to the question of "how to do more with the same" or, even better, "how to do more with less." This approach narrows down the problem to be solved in order to optimize specific areas that can be perfected. It tends to repeat itself in an effort to achieve this improvement, in the same way that a scientist repeats each experiment at her laboratory while keeping the conditions stable, the manager who wants

to take an engineering, process oriented approach will seek to repeat the context and will eliminate divergences to the desired and predetermined path of development.

The humanities approach, on the contrary, seeks difference, originality and creativity. It intentionally explores alternative ways and often deconstructs what had previously been assumed as settled and taken for granted. It searches for the understanding not of the immediate problem, and certainly not of one area within a problem, but of the larger context where the problem is formulated and makes sense. Therefore, the humanities approach takes a broader and more complex approach and, thus, its achievement cannot be evaluated in terms of measurable immediate results but rather in terms of its capacity to improve the sense making activities taken as a whole. The two approaches correspond to two ends of the same spectrum. They complement one another and are dynamically balanced through a creative tension. They serve diverse, though *complementary*, functions. The engineering approach to the notion of process has the following functions: to systematize, bureaucratize, turn into effective procedures, pre-determine, plan, control, and optimize through a linear rationale. The humanities approach to process has as functions: to rethink, reformulate, deconstruct, innovate, recreate, renew, reinvent, connect, communicate, and to optimize through non-linear rationalization.

Within management practice, though the straightforward, engineering approach is the dominant one, there is a gradual recognition of the relevance and of the complementary nature of the humanities perspective to the notion of "process." This development can be recognized by the importance given to the concept of "knowledge" through ideas present in subjects such as the "knowledge economy" and "knowledge management." Even when such approaches take a commodity approach to what is meant by "knowledge," meaning something that may be exchanged, acquired, stored, retrieved, distributed, etc, there is an unavoidable move toward the acknowledgement of the intangible and tacit nature of knowledge as a process, as something that is lived and experienced within a social context. Nonaka's (1991) work on Polanyi's (1958), who coined the terms "tacit" and "explicit," is an example of such movement.

The literature on knowledge management and on organizational learning stresses the different strands that coexist within these fields: one more results oriented, individual focused, and deriving from cognitivist theories; and another one more process oriented, focusing on community, and based on social theory (Easterby-Smith and Araujo, 1997; Easterby-Smith and Lyles, 2003). To synthesize, the procedural, engineering, plan-execute-control, approach to the notion of "process" is connected to the cognitivist and individual centered theoretical line of thinking, whilst the view of "process" as something embodied and socially embedded, typical of the humanities approach, is community focused and is linked to social theory.

According to this line of reasoning, there is a general consensus regarding the question of "why" it is relevant to look into knowledge processes; the question of "how" is trickier to settle. How may the command-and-control oriented and the social-embedded approaches to the notion of process be integrated and complemented?

The answer to the "how" question can take the form of different recipes but, more important than that, it is critical to identify the different worldviews and paradigms that support and legitimate each proposal. This is the role played by the philosophy of science where the process of scientific production is analyzed taking into account the paradoxical and often non-official issues related to power relations, community inner rules, unconscious pressures, historical and political contexts, etc. The history of ideas cannot be isolated from the contexts that gave rise to those ideas, and the insights brought into this production process are critical to its improvement, whether we consider the production of management theory or of other knowledge fields. These insights, again, are to be taken as a *process*, as something to be continually nurtured and fostered, and not as a single once-and-for-all result. More importantly, this *on-going interpretation* is highly relevant for *practitioners* as it corresponds to the most effective way to improve one's practice because it intensifies and highlights the sense making process. To recognize and value such enterprise is an effort with a very high "return-on-investment," both for the practitioners themselves and for the organizations that may benefit from such insights.

4 The Epistemic Shifts—The Emergence of a New Paradigm in Management Thinking

The "social turn" in organization theory corresponds to a gradual movement that cannot be easily identified. Therefore, the question mark in the title of this article: are we really facing a *radical* shift in management thinking?

It is critical to distinguish between mainstream traditional management theory and the myriad of complementary approaches that have contributed to the development of alternative perspectives. The dominant stream of management theory is still largely influenced by the command and control paradigm developed over a century ago by early theorists such as Weber, Taylor and Fayol. Though the control paradigm today is closely connected to a technocratic and functionalistic perspective of management science there is a growing awareness of the dangers of assuming a reductive and limited view of organizational complexity. In other words, though it is important to *recognize the role* of bureaucratic, functional, and procedural like aspects of organizational life, it is critical to *complement* these perspectives with *richer and more human centered* interpretations of organizational reality.

This critical role is performed by, among others, communities of practice theory (Brown, Duguid, 1991, Lave, Wenger, 1991, Wenger, 1999, Wenger,

McDermott, Snyder, 2002). The importance of the concept of communities of practice at an organizational level is parallel to the growth in the interest of management approaches, such as organizational learning and knowledge management. At a broader level, this development reflects reactions from management and organization thought and practice to the reality of the knowledge economy of the information age (Kearmally, 1999; Drucker, 1999). This movement may be considered as the tip of an iceberg, as the culmination of a long process of development that is still going on.

Easterby-Smith and Lyles (2003) identified four main authors that have had a significant influence in the organizational learning field many years before the term was used: John Dewey, Michel Polanyi, Edith Penrose, and Frederick Hayek. Argyris and Schön's work (1978) on how to improve work practices led to the creation of the bedrock of organizational learning as a study field. K. Weick (1995, 2001) developed an approach to organizational sense making that can be said to be closest to the organization theories that emphasize reflexive practices (Schön, 1982). The organizational sense making approach is a "vision of a vision," a "framework of ideas about a framework of ideas" and a "book on interpretation"; and the argument behind it is that there is a need to make explicit what was previously implicit (Weick, 1995).

Nonaka, Toyama and Byosiere (2001), describing their theory of knowledge creation argue that their foundations come from pragmatic philosophy and from oriental philosophy, emphasizing links in the contextual dependence of knowledge, and the unity between cognition and action. Therefore, they leave behind the traditional vision of organizations as static and passive machines of processing information, and they offer a dynamic vision of the organization as an entity that continually uses and creates knowledge.

Gherardi and Nicolini (2001) developed an approach to organizational learning according to a sociologic perspective and they use terms such as "reflexivity" and "participation" as essential elements for the understanding of organizational development phenomena. They argue that reflexivity cannot be restricted to the cognitive component and that it involves hermeneutic processes of interpretation, intuition and imagination.

Looking into the organizational learning field of study through a sociologic and post-cognitivist perspective it is possible to identify the influences of the different schools of thought that helped to mould the perspectives that go beyond the neo-rationalist, procedural, normative and prescriptive approaches on organizational learning. This "social turn" corresponds to an emphasis on the *participative* and *collaborative* aspects of work and learning, based on the notion of the social construction of reality, through a practice-based approach which is experiential, pre-reflexive and centered in action (examples of this approach are the works of Kolb (1984), Engström (1987), Gherardi and Nicolini (2001), and Elkjaer (2003)).

The works of the German philosopher, Martin Heidegger (1996) and the hermeneutic ontology, as well as the American philosophical school of pragmatism, created by C.S. Peirce (1955) and followed by John Dewey

among many others, correspond to two of the most *important influences* within the development of the social perspective in knowledge management and organizational learning, the so-called "social turn." Among the authors responsible for the sociological approach, who explicitly argue about the important role played by hermeneutic ontology and pragmatism, are Gherardi and Nicolini (2001) and Elkjaer (2003).

According to Elkjaer (2003), the approach of organizational learning from a sociological perspective emerges as a critique to the previous reductive, individualistic centered and cognitivist based perspective on organizational learning. Elkjaer (2003) presents a "theory of social learning," and argues that the sociological approach to organizational learning coincides with the influence of social constructivism in the social sciences and in education through the works of Berger and Luckman (1991/1966), among others.

Constructivism, as an epistemic strand, is a rejection of the positivist approaches to the interpretation of reality as objective, where only a single interpretation is possible, and where this interpretation can be explained through hypothetic-deductive methods. Constructivism argues that reality is not objective and that multiple interpretations are possible because what we perceive as reality is the product of a social construction, i.e., reality is socially constructed.

According to Elkjaer's theory of social learning (2003), "learners" are social beings that construct their understanding and learn through the social interactions in which they take part, within specific socio-cultural contexts. This perspective stresses that the theory of individual learning is limited to the epistemological aspects of learning, while the social theory of learning includes both epistemological and ontological aspects.

Epistemology considers questions of "knowledge about knowledge," while ontology is directed to the study of "being" and the manifestation of reality. The social perspective on learning, integrating both epistemic and ontological perspectives, implies that it focuses on knowledge in terms of "content" and also in terms of "process," focusing on the practical and quotidian aspects of the social, cultural and historical contextualization of such "content." Epistemology considers reflexive activity, formally rational and conscious, while ontology includes also pre-reflexive, rational-intuitive and unconscious activity. Instead of using nouns, ontology is best expressed by the use of verbs that transmit the notion of movement and continuity, situated and socially contextualized, and not an exterior transaction, commodified: "learning," "being" and "becoming," instead of normative prescriptions of what constitutes creating and sharing knowledge. "Knowing" instead of "knowledge."

Therefore, the radicality of the "social turn" in management thinking is not related to large numbers or to the visibility of the changes in terms of its impact in the media. Rather, its radicality derives from the newness of its perspective, for its change of paradigm. However, this development may go

unnoticed if we fail to recognize the need for a change in the reading matrix. The above mentioned change of paradigm places its focus and its epicenter on the intrinsic and inherent nature of all human action and thought as socially embedded phenomena.

In order to grasp the importance of this change it is critical to point out that this notion of social embeddeness has surpassed the traditional binary opposition between individual and social issues which still permeates current and mainstream management and organizational perspectives. Instead of opposing or separating psychological and sociological issues, it treats the individual and the collective, the internal and the external, the inner and the outer world as a unique single reality. In other words, it does not partition and divide, study each isolated part, and then take the result of this process for the whole. Rather, it takes the whole from the start.

Two of the fundamental influences to this change of paradigm are pragmatism and hermeneutic ontology. Heidegger's (1996) instance of being-in-the-world, as opposed to the subject-object relationship, cannot be easily grasped but it implies a profound shift in thinking, an epistemic shift. The message and potential impact of these two theoretical contributions carries a strength that goes beyond the possible recipes and methodologies that it may inspire. The next section briefly describes one such methodology.

5 The Semiotic Learning Framework—an Innovative Approach to Organizational Learning

The present section presents an organizational learning framework that has been derived from the fields of management and organization science, and from social philosophy (Benton, Craib, 2001). The central aspect to highlight is the importance of meaning-making for the processes of community building and identity enhancement at the organizational level. The richness and theoretical scope of the framework is also a form of syncretism as the contributions from the authors, the categories, and the theoretical approaches all share a common standing and thus mutually support and reinforce one another. The main applications for the theoretical framework are presented and these include three different levels: organizational learning applications, educational applications, and applied organizational research.

5.1 Central Questions

The Semiotic Learning Framework is like a three legged stool: besides pragmatism and hermeneutic ontology it rests upon social semiotics, an area that links social relations and individual meaning making, or signification. Why does semiotics matter? Because, if we want to understand the relationships between culture, mentality and social relations, and their impact on individuals, we need to take into account the symbolic processes that constitute

and characterize human contexts. Human contexts are made of interpretation processes that occur continuously, at a conscious and at an unconscious level. Semiotics is as old as philosophy itself and it has developed throughout Medieval, Modern and Post-modern ages. The branch of social semiotics is typically post-modern as it takes a post-structuralist stand: beyond the search for the identification of rigid structures, it aims at identifying the dynamism and the patterns that form the complex network of social relations and meaning creation. Social semiotics takes a multiple-text approach instead of a single text one; it is sensitive to complexity, to ambiguity and to paradox. The issues of power, of group pressure, of social subjectivity, of narrative, and of discourse are strong items in the social semiotics lexicon.

The "social turn" in knowledge management and in organizational learning led to different approaches and opened the door to the exploration of theoretical inputs from a wide range of areas. The Semiotic Learning Framework enables the development of two critical areas: the quality of community life and the meaning making process at the organizational level. It facilitates and fosters organizational learning through the development of an awareness and of an attentiveness to complexity. By being aware of the processes and the patterns of meaning creation it is possible to work on them constructively, benefiting both individuals and organizations. Innovation comes from the acknowledgement of vicious-circles and dead-ends and the investment on positive and action-led approaches. These approaches take into account the *need for balance* between what has to be stable, structured and systematized and that which has to be creative, dynamic and open. The importance of recognizing the daily pressure of these creative tensions enables the development of a pro-active attitude, thus cherishing innovation.

The question of "why semiotics" is as difficult as the one "why learning" because both deal with processes of human development that are always and unavoidably present. Therefore, at a certain level, they are both redundant words because, in a sense, they refer to life itself. To live is to learn, and to learn is to interpret, and to interpret is to use symbolic reason and to create meaning. At an organizational level *knowledgeprocesses* are important because they help us to focus on the critical role of this learning/meaning creating dynamism. It is not enough to understand knowledge as a socially embedded and embodied process; it is necessary to grasp the functioning of such mechanisms. Language is tricky here because this meaning making corresponds to a non-mechanical process. It is a process of interpretation, of reading reality, not in a pre-defined, precise, and reductive way but in a creative and constructive way, because all meaning calls for the further development of more meaning. The best word to describe this process is to call it transformation. Both individuals and organizations learn, develop and transform themselves, and the better we are at understanding these *transformation processes* the more able we are to profit from them.

5.2 Theoretical Background

The Semiotic Learning Framework (SLF) uses social semiotics theory as its main foundational theoretical approach. Social semiotics, developed by Halliday (1978) and Kress (1985) among others, developed out of the Saussurean school of thought. Besides the influence of Saussure's theories, through social semiotics, the SLF also draws on Peirce's (1955) pragmatism. The SLF, by insisting on the links between theory and practice, the individual and the social, the internal and the external, by arguing in favor of practice-based and action-driven approaches, and by focusing on the spontaneous and natural, trivial and quotidian development of everyday organizational life, uses a pragmatic approach as developed by Peirce. Focusing on self and agency, from social semiotics theory the SLF takes the notion of interdependent social practices, its concept of social subjectivity, and contributions from the social theory of discourse. The theoretical breakthrough work of Bakhtin (1981), Wittgenstein (1958), Bourdieu (1998) and Foucault (1972) are used as foundational background references to the particular approach developed in SLF, an approach that proposes a new standing in terms of organizational theory and practice.

5.3 The Context of the Knowledge Economy of the Information Age

The centrality of information and knowledge in current economic and social processes justifies the concept of the "knowledge economy." The knowledge economy of the information age (Kearmally, 1999; Drucker, 1999) stands for the prevalent context of increasing levels of complexity, turbulence, and the pace of change that characterizes the global markets of present times. This context was set forth by the rapid technological development of the second half of the twentieth century. Therefore, the last quarter of the century witnessed an increase in the number of organizational theories directed at enabling organizations to deal with and to profit from the opportunities, as well as to avoid the risks, of the new organizational reality.

The Semiotic Learning Framework, as an organizational learning initiative, builds on these theories and highlights some of their key concepts. Core concepts of the SLF are: collaborative forms of work and learning, knowledge creation and sharing, reflexive practices and double-loop learning. The fundamental need for collaborative practices and forms of work and learning is intrinsic to the current context of the knowledge economy. While in traditional neo-classical economics knowledge was understood to be an implicit production factor that was subject to the rule of diminishing returns, within the present context, knowledge represents a central factor of production that presents the unique characteristic of increasing returns, thus increasing its value while being used and shared.

The importance of learning arises directly from the need to disseminate and share knowledge across an organization through learning. Within the context of the SLF, "learning" refers to more than the reductive view of formal organizational training or to the aggregation of individual learning processes. In similar terms, collaboration acquires an emphasis and a connotation that surpasses previous protocol or superficial etiquette rules within organizations to become the main drive for, and key issue behind, organizational growth and development. The theory of communities of practice (Lave, Wenger, 1991, Wenger, 1999, Wenger, McDermott, Snyder, 2002, Brown, Duguid, 1991) incorporates a social theory of learning and of collaboration, emphasizing the social embeddedness and embodiedness of all learning processes. Therefore, it places the social dimensions of learning and of collaborating as the central and decisive criteria for organizational innovation and success. The degree and capacity that an organization incorporates in terms of collaboration and learning fundamentally determine its potential to innovate and develop.

The fields of organizational learning and of knowledge management have been influenced by a web of authors and of baseline theories. Argyris and Schön's (1978, Argyris, 1992) notions of individual mental models and of single and double-loop learning processes largely influenced P. Senge's work on learning organization (1990). The importance of questioning one's own assumptions and of reflective practice, key concepts in Argyris and Schön's work, are critical foundations of organizational learning theory. Senge also relied on Bohm's concept of dialog (1965, 1983) and on systems dynamics (Forrester, 1971, Meadows, 1982), thus presenting the learning organization as a system. Peter Senge (1990), states that "organisations change only when people change, and people change only when they change from within." Equally critical is Nonaka's model of knowledge creation in organizations (Nonaka, 1991, Nonaka, Tekeushi, 1995). Like Senge, Nonaka also draws on systems thinking, including some concepts from chaos and complexity theories (Prigogine, 1980) that he treats as extensions of systems thinking. Bateson's (1973) work on the ecology of the mind influenced Nonaka's learning theories, though the major influence comes from Nonaka's biased reading of Polanyi's (1958) work, therefore differentiating and separating tacit from explicit knowledge.

Since late 1970s there has been a growing interest in the notions of learning and on the creation and management of knowledge or of intellectual capital in organizations. From an industrial age context, the new age of knowledge work in the information society represents a global pattern of change that includes new forms of organizations and different ways of managing them. The main assets of the industrial age were traded in markets so that the organizations could be objectively valued. In the new knowledge economy, *knowledge* is the major asset and since it cannot be directly traded in markets there are difficulties in valuing organizations, so that the intellectual capital movement calls for new forms of measuring and managing organizational knowledge assets (Stewart, 1997). The task of managing knowledge assumes

that knowledge is in individual minds, mostly in a tacit form, and that it may be converted into an explicit form, and be stored and manipulated by the use of information technology. The cultural reluctance to share knowledge requires leadership, and a management style that encourages and persuades knowledge sharing by promoting dialog. This *mainstream perspective* on knowledge management has benefited from the constructive criticism of approaches that call attention to the intrinsic and complementary processes that occur within organizations, such as the importance of communities of practice in the generation of knowledge (Lave, Wenger, 1991, Brown, Duguid, 1991), and also the view of organizations as sense-making systems (Weick, 1979, 1995, 2001). The importance of informal forms of learning, of conversations, and of storytelling, focus on the role of narrative forms of knowledge, and on *alternative interpretations* to the process of creating, sharing and storing knowledge.

5.4 Organizational Key Issues

SLF acknowledges the early contributions of social theory research to the field of organizational studies. Current organizational approaches may be enriched by the incorporation of key insights from pioneer, though still active, research traditions. Appreciative inquiry is a fundamental aspect to be acknowledged:

> Appreciative inquiry involves a systematic discovery of what gives life to a living system when it is most alive, most effective, and most constructively capable in economics, ecological, and human terms. (Cooperrider et al, 2001).

G. Vickers (1965) work on appreciative systems developed a tradition that is still relevant in today's organizational settings. According to Vickers, we perceive reality selectively according to our judgment making–our "appreciation–and this process consists of *relationship management*, within which *goal seeking* represents one of its particular cases. Vickers rejects the goal-seeking model of human behavior, and also the cybernetic paradigm, where the course to be steered is available from outside the system, whereas systems of human activity themselves generate and regulate multiple and mutually inconsistent courses, thus constituting an autopoietic system (Maturana, Varela, 1980).

The process of designing organizational learning initiatives is itself anchored in a *systematic collaborative inquiry process* into the organization's learning experience and practice (Shani, Docherty, 2003). Appreciative inquiry thus has advanced beyond being a philosophical orientation to becoming a theory and a method for systems learning and development. It fundamentally seeks to build *constructive ongoing dialog* between people in an organization, a dialog about past and present learning capacities, processes, innovations, and unexplored potentials.

The contributions from systems thinking and from complexity theories are also critically highlighted within the SLF. Holistic thinking refers to the perspective of perceiving reality as a whole, not as "the whole" but as "wholes." Historical examples of holistic thinkers are Aristotle, Marx and Husserl, however the institutionalization of holistic thinking only occurred in the 1950s through the development of systems thinking and of the general systems theory (Checkland, 1984, 1999). In the 1970s, the soft-system approach developed, and instead of perceiving the world as systemic, it perceived it as a complex whole that could be explored through alternative world-views and a systemic process of inquiry, that focused on learning leading to action rather than on optimization. Hard-systems focus on problem-solving, and model organizations as coordinated functional task systems seeking to achieve declared goals, and thus see the task of management as decision making in support of goal seeking. H. Simon (1996) developed this type of approach that proves to be extremely effective in situations where there are clear-cut performance measures, and goals are objectively defined.

Soft-system methodology arises as a complement to hard-systems perspective and it focuses on *open complex systems*, systems that are in constant interaction with their environment, and where the social and political aspects of the system are especially taken into account. Within the theoretical development relevant to the present organizational context the theories about complexity, emergence, turbulence and chaos are critical. From a non-mathematical perspective, chaos theory, the non-linear, and complexity may be taken to be a *single paradigm* (Urry, 2003, Prigogine, 1980).

Complexity has also been theorized beyond systems thinking, and Stacey (2001), though acknowledging the importance of systems thinking, and being closely related to the aims of soft systems methodology, focuses on organizations as *complex responsive processes of relating*, where iterative processes sustain continuity with potential transformation at the same time. According to Stacey (2001), analogies drawn from natural complexity sciences are based on a Kantian and idealistic view in which nature is assumed to unfold from already enfolded forms. However, this perspective does not encompass an explanation of the emergence of truly novel forms. This strand of complexity thinking is an extension of systems thinking about nature. An alternative perspective is that derived from Hegel as interpreted by Mead, in which the future is understood to be under perpetual construction, and it is this second strand of the complexity sciences that constitutes the *source domain* for analogies with *human action* (Stacey, 2001).

Chaordic systems thinking is a conceptual contribution for explaining human performance management under turbulent conditions, that is presented as a new paradigm for working life (Eijnatten, 2003; Backström, Eijnatten, 2002); this approach tries to account for the emergence of real novelty "in terms of Stacey." Chaordic systems thinking recognizes that systems are complex, dynamic and non-linear, in which chaos and order co-exist. This approach is based on an understanding of systems as holons,

entities that are both wholes and parts, both autonomous and dependent; and it agrees with Stacey's argument of the previous system approaches as suffering from a Kantian split, and from being highly embedded in a *control paradigm* (Eijnatten, 2003). The perspective of chaordic systems thinking (Eijnatten, 2003), which uses the chaos metaphor as an *interpreting lens* and that recognizes systems as being simultaneously ordered and chaotic, is presented as a new holinic approach and as the next-generation framework for socio-technical systems design. Holons are entities that are both wholes and parts of a greater whole.

Socio-technical approaches are gaining wide recognition. The term "socio-technical system" was coined by E. Trist to describe his team's work at the Tavistock Institute on the *interrelatedness* of environmental, social, and technical systems of organizations (Emery, Trist, 1969). The origins of socio-technical systems date from the period after the second World War, when E. Trist and F. Emery, two social scientists, pioneered the movement toward experimentation with *alternative work redesigns*, different forms of employee involvement, varied degrees of autonomy and responsibility in work teams, *participative management* orientations, and the development of *learningsystems*, all with deep concerns regarding economic performance.

The present study acknowledges the overwhelming importance of both systems thinking and of structuralism in current interpretations of both organizations and societies as a whole. Nevertheless, this acknowledgment of systems thinking and of structuralism aims at *searching beyond them*, thus contradicting the dominant and mainstream management approach that takes for granted a systems perspective.

5.5 The Learning Cycle Steps

The SLF is organized in a series of four steps that represent the different stages of a learning cycle. Organizational learning is a continual, though not necessarily continuous, process, and organizational learning design tools direct, inform and facilitate this learning process. These steps are to be understood as an *iterative mechanism* balancing the *tension* between theory and practice, between personal and organizational learning and development, and between the formal and the informal, the structured and the unstructured, and the predictable and the unpredictable elements of organizational life. The key idea is that theory and practice are interdependent and mutually determine each other. In similar terms, individuals and organizations simultaneously influence one another in a permanent interaction.

The predictable elements of organizational procedures may have an enabling or a restraining influence in relation to organizational learning initiatives. Formal organizational practices are a medium as well as the result of the unpredictable and informal components of organizational dynamics, i.e., structures determine, condition and influence processes,

and these simultaneously recreate and transform the structures, in an interdependent way.

A crucial issue within the SLF is the identification and acknowledgement of these interdependencies and interactions, and the development of alternative creative and innovative *organizational practices* that enable the exploration of each organization's full potential. This potential critically depends on the degree of openness and flexibility present in every institution and the SLF works on these characteristics. The four learning-steps of the SLF are the following:

(i) Ice-break - Raising key issues
(ii) Experiencing—Confronting reality
(iii) Action Horizons - Transformative learning
(iv) Innovative Practice—Open dynamism

Ice-Break—Raising Key Issues

The first step of the learning process consists on an introduction to the domain of organizational learning from the perspective of the SLF. More important than delivering prescriptive notions is the raising of *key issues* that may enable a *questioning process* to develop. Within the broad field of organization theory, several approaches are relevant. These correspond to the *organizational key issues* Sect. (5.4):

a) appreciative inquiry;
b) open complex systems;
c) socio-technical systems;
d) collaborative work and learning;
e) knowledge creation and sharing;
f) reflexive practice and double-loop learning;
g) trust and social capital.

Experiencing—Confronting Reality

From the first introductory step, a general understanding is developed that has to be confronted with the individual and organizational reality that is specific, situated and circumstantial. The degree of detail of the first step depends on the prior knowledge and familiarity with the areas and approaches included as the framework's key issues. As the SLF involves the repetition of the learning cycle, some of the aspects may be omitted from the first round and/or others added later. The central idea is to grasp one or several notions that are able to open new grounds for analysis and debate.

From the analysis and debate of step one, step two consists of bringing forth the key issues raised, and confronting them with the daily organizational life. "Experiencing" is thus a process of attentiveness to the specific circumstances of organizational reality. It aims at gradually

making explicit the *conditions of possibility* for organizational learning to occur in a conscious and intentional form. These conditions of possibility involve both *action-possibilities* and *thought-possibilities* (Karl Jaspers' terms, Young-Bruehl, 1981), i.e., both the ability to perform and the interest in doing so.

This field-work step incorporates two simultaneous lines of development. In the sense that every individual and every organization has an intrinsic capacity to learn, to develop and to innovate, it is important to focus on the issues that limit and restrain this capacity, the barriers, blockages and dead-ends. This *innovation capacity* is a raw material, a hidden potential that needs to be fostered, promoted, encouraged and facilitated. So there is a negative focus, of reducing the barriers and limitations, and a positive focus, of improving and strengthening the creative learning capacity.

Action Horizons—Transformative Learning

The third step returns to theoretical presentation and discussion. The broadening of horizons and the development of new perspectives is fundamentally rooted on the kind of mentality, mind-set, and world-view prevalent in each community and organization. In order to improve the understanding and questioning capacity, certain key theoretical concepts have to be explored and operationalized. This developmental process may be characterized as consisting of both learning and un-learning instances and it reflects a disclosing and dialogical standing. The SLF's *working concepts* (not developed here for reasons of space restrictions) consist of philosophical concepts from six relevant thinkers (Bakhtin, 1981, Halliday, 1978, Wittgenstein, 1958, Foucault, 1972, Heidegger, 1996, White, 1978), and four philosophical categories. The central *working concepts* within this framework are the following:

a) Bakhtin's concept of *dialogism*
b) Halliday's notion of *grammar*
c) Wittgenstein's concept of *language-games*
d) Foucault's concept of *discursive formations*
e) Heidegger's concept of *being-in-the-world*
f) White's concept of *master tropes*

The four philosophical categories that are relevant are the following:
a) Action; b) Language; c) Knowledge; d) Meaning

These key concepts and categories may only be operationalized gradually, in a disclosing and dialogical way, as was referred to above. They are to be developed according to the conditions of possibility identified in step two. The critical idea is the transmission of the SLF rationale that is based on the development, intensification and deepening of communities within organizations as it is at communities level that the meaning-making process

may be enhanced. The *working concepts* are thus a critical element within the process of internalization of the reflexive practice that constitutes this learning framework.

Innovative Practice—Open Dynamism

The fourth and last step of the learning cycle focuses on *acknowledging the emergence* of developmental and innovative learning patterns, and on opening new *windows of opportunity* for organizational development and community building to take place. It is critical to insist on the issue that organizational learning must first be promoted and fostered within smaller communities and only then may it be spread throughout the organization. The community level represents both the focus of the theoretical aspects of the framework as well as the focus of its practical application. In this sense, and within this framework, the notion of *situated-action* refers to the deepening and intensifying of communities at organizational level, as it is community level situated-action that enables collective meaning-making and shared understanding—that, in turn, is at the basis of knowledge creation and sharing at organizational level.

There are specific organizational learning design initiatives that arise from the theoretical development of step one and step three, however, these have to be situation-specific and cannot be generalized or recommended and implemented in a normative and prescriptive way. The theoretical concepts refer to that which is possible to generalize, but the practical application of this organizational learning framework does not propose specific practices. On the contrary, the SLF ascertains that the organizational practices should be transformed and improved according to the situated reading, interpretation and understanding of specific communities confronted with concrete realities. Again, the key issues are openness and flexibility, not in terms of functionalistic roles or job-profile, but in terms of mentality, mind-sets and world-views. Not as rationalistic mental-models but as reflexive and insightful pragmatic oriented action-centered and practice-based approaches.

Organizational learning never ends, and as each community and organization develops, new areas are disclosed that in turn need further understanding and development, so that the cycle restarts with the first step - ice-breaking and the identification of key issues. There is not a clear cut division, either among different steps in the cycle or among different cycles, so that it is possible, and even desirable, that there is not a perfect, homogenous and symmetric development in relation to different issues and aspects of organizational life. The point that has to be made is that this framework consists in a possible approach to organizational learning and that it presents an idiosyncratic theoretical perspective that is renitent to accept a single, unique, monolithic and standardized discourse on organizational practices. Therefore, though there is a constant subjacent reference to organizational practice throughout the development of the SLF, it cannot subscribe specific practices, as these are themselves the result that is delivered through the

application and use of this theoretical framework for organizational learning. If the SLF were to list a set of specific practices to be applied uniformly at an organizational level, then it would be a contradiction in its own terms.

5.6 Applications of the Framework

The Semiotic Learning Framework refers to a theoretical approach to organizational learning, and, thus, its privileged application domain is that of organizations as such, in particular the knowledge-intensive ones. The use of management and organization theories, when combined with the contributions of social philosophy, brings groundbreaking perspectives to the understanding of the complexity of organizational reality. Therefore, the SLF has a wider range of applications' domains than its immediate organizational field, including the areas of applied organizational research, and the field of postgraduate education, for both managers and information technology professionals. The SLF, in theoretical terms, assumes the locus of a community as the privileged arena for the promotion of organizational learning initiatives. In similar terms, the SLF practical application assumes that it is within a community that its insights may be learnt and fully explored.

Organizational learning initiatives are the first instance for the application of the framework because it is at the organizational level that the SLF is directed. As an organizational learning framework it includes three interrelated dimensions: organizational design, organizational consulting, and organizational audit. Another level of analysis also refers to a triangular relation between: (i) web-based community building mechanisms, (ii) group dynamics and training, and (iii) personal support through coaching, mentoring and tutoring. Organizational design corresponds to both the creation and the developmental organizational stages where the SLF is applied on a continual basis as the background work supporting the organizations' rationale.

Organizational consulting corresponds to the application of the framework to deal with specific and critical situations, when strategic decisions have to be made or when there is conflict or an organizational identity crisis. Organizational audit corresponds to the use of the framework as an evaluation device, as a means to determine the potential for development and the gap between that potential and current reality. Organizational evaluation, self-assessment and internal consulting are areas that the SLF helps to strengthen as key strategic areas for organizational development.

The SLF application within an educational setting potentially includes a postgraduate course (eg. an MBA), an on-line course, and a vocational and professional training initiative focusing on the relationship between information systems and social theory. The target public of these educational formats is management and information technology professionals, though they may be extended to other organizational directed professionals. The areas of potential development of the framework within an educational setting are: (i) information technology and social theory, (ii) project management and policy

formulation, (iii) strategic innovation management, and (iv) information systems analysis and development.

The SLF may be used within the field of applied organization research focusing on three interrelated aspects: transdisciplinary action-research, social philosophy informed research, and practice oriented research. The framework explicitly assumes a certain theoretical orientation and its application as a research approach does not determine exactly the end product of the research but rather gives a common orientation and rationale that may be understood as a background methodology, i.e., a set of principles directing the theoretical perspective that supports and grounds the research. Organizational practices are understood as conveying a dynamic rationale that continuously defines the organization's core identity. The SLF as a potential research approach explores this dynamism and aims at a better understanding and subsequent promotion of organizational innovation and development.

5.7 Final Words

The present section has presented, described and discussed the theoretical framework of Semiotic Learning: a work-methodology that promotes and facilitates learning in knowledge-intensive organizations. The Semiotic Learning Framework is a theoretical approach to organizational learning based on an action perspective and supported by social semiotics and other related theories and concepts. The SLF includes a learning cycle, key organizational issues and central working concepts. The possible applications of the framework are also discussed. The SLF is a contribution to the field of organizational learning that focuses on innovation and creativity as critical elements within the current organizational context of increased complexity.

The central aspect to be considered is the theoretical standing that this framework proposes: *the inquisitive, critical, boundary expanding and creative-thinking perspective.* Though reflexive practices are widely acknowledged in organizational learning literature as having a paramount importance, Semiotic Learning draws on theoretical approaches that are specialized in reflexivity *per se.* Though there is a large variety of approaches that have been integrated into the SLF, their scope points in a single direction, that of exploring post-cognitivist and non-mentalistic approaches to reflexivity. The SLF calls attention to the taken for granted assumptions of mainstream management thinking and explicitly proposes an alternative and complementary perspective. This perspective includes a theory and also a praxis, i.e., it has to be lived through and experienced in order to be fully understood. Nietzsche, Dilthey, Heidegger, Jaspers, Wittgenstein and Foucault also emphasized the practical nature of their philosophical work and they all explicitly claimed that their thought could only be valued as making a difference in terms of how life itself is lived.

6 Conclusions

The complexity of current organizational contexts implies the need for innovative theorization of learning at the organizational level. Organizational learning represents a critical aspect of each organization's capacity to innovate, and to nurture and maintain its inner dynamism.

The Semiotic Learning Framework is presented as a theoretical approach to organizational learning, and as a working methodology to be applied within organizational contexts. It derives its rationale from social semiotics and from social philosophy and it focuses on critical organizational key issues. This framework is to be applied as an organizational learning initiative at the organizational level, as the content of a post-graduate program, and as a methodology for interdisciplinary team works.

Organizational learning is an *application domain* and this implies that it can be approached through different epistemic lenses. Indeed, organizational learning, as well as organization theory in general, has been subject to different influences. James March used the term in 1958, though it was through Argyris and Schön's (1978) work that organizational learning became established as a management research theme and as an organizational practice, and it was through Senge's (1990) contribution that it became widely disseminated. Contemporary approaches to organizational learning give witness to the wide variety of schools of thought that contribute to the richness and complexity of this managerial field.

Organizational learning has developed in parallel with other organizational theories that are part of management science's efforts to respond to the challenges and opportunities posed by the knowledge economy of the information age (Kearmally, 1999; Drucker, 1999). Knowledge management and communities of practice are examples of such theories. Within knowledge management there has been a development from an initial focus on technology related issues, to a focus on the individual and on individual competencies, and then to a focus on the social aspects of knowledge creation and sharing. Communities of practice theory has always had a focus on the social embeddedness of knowledge processes. Organizational learning initially had a systems thinking focus, then it further developed a cognitivist perspective, and finally social oriented approaches started to emerge. Current approaches to organizational learning show an identification with one or with several of these perspectives.

The particular approach that the present chapter proposes belongs to a specific line of thinking, though it claims that it is necessary to understand the radicality of its assumptions. This radicality is connected to the paradigmatic break proposed by *pragmatism*, developed by Peirce (1955). Pragmatism argues for a non-dualistic split between mind and body, and between theory and practice. It responded to the Cartesian focus on the individual, assumed to be an autonomous and independent subject, by arguing that the individual and social dimensions are part of a single reality that has to be *taken as a whole* and that cannot be analyzed separately without the risk of missing its essence.

Many organizational learning approaches claim being influenced by American pragmatism, including Argyris and Schön's (1978) initial contribution. The ideas of *experiential learning* and of *processes of inquiry* are an inheritance from pragmatism. Nevertheless, the present paper argues for the need to radically explore this line of thinking and in order to do so it integrates contributions from philosophy and from social theory.

Heidegger's (1996) ontology and its influence in contemporary hermeneutics through the works of Ricoeur (1981) and Gadamer (1975) are a critical contribution to the development of organizational learning, as has been identified by Elkjaer (1999, 2001, 2003) in her "social theory of learning." She claims that only through an *ontological perspective* it is possible to integrate the social and the individual dimensions because an individual focus only takes into account an epistemological perspective. Therefore, her "social learning theory" integrates both an ontological and an epistemological approach.

Besides *hermeneutic ontology* the approach being proposed, Semiotic Learning, draws on *socialsemiotics* in order to connect the processes of meaning-making with the social environment within which such processes occur. From a sociological perspective, meaning is derived from the social contexts, structures and processes that determine its content. Social semiotics, however, goes further in this analysis by integrating the social and the individual aspects of meaning-making. Semiotics, the science of signs, claims that knowledge is inherently linked to symbolic reasoning and social semiotics analyses the social parameters of this reasoning.

Therefore, ontological hermeneutics, which focuses on the interpretation processes presented by Heidegger's concept of *being-in-the-world* (as opposed to the Cartesian *subject-object* ontology) and social semiotics, which focuses on the social embeddedness of all meaning-making processes, together constitute a powerful theoretical matrix that has radical practical implications both in terms of *personal* and *organizational development.*

The Semiotic Learning Framework takes the full implications of pragmatism by integrating both individual and collective perspectives, so that learning is understood as a *developmental and transformational process* that may be identified both at individual and at an organizational level. Semiotic Learning firstly implies a *radical shift in thinking*, one that is not centered on the individual mental efforts or on volunteeristic approaches but rather on the development of an attentiveness and of an awareness that corresponds to a decentering and to an inquiring process that are parallel to Derrida's "deconstruction."

Semiotic Learning represents a radical shift in thinking in relation to mainstream management approaches that are centered on prescriptive and normative contributions. Breaking with this pattern is a question of grades and not a black and white, or yes or no, issue. As has been referred to, several organizational learning perspectives take this social and pragmatist approach, though Semiotic Learning argues for the need to develop it further, and this development has radical consequences both at the personal and at the organizational level.

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Management of the Knowing and the Known in Transactional Theory of Action (TTA)

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Abstract: In this paper we will support a view that considers the explicitation of knowledge as being one among the diverse strategies allowing transferring the activities performed by a small community of action in a larger collective whose practices will have to be distributed spatially, socially and temporally.

1 Introduction

It is generally agreed among second-wave research workers in the field of knowledge management that knowledge is not just something people possess, or which is deposited on written media after undergoing a process of codification. As Amin and Cohendet (2004) have stated, for example, there are three misconceptions which have to be corrected before one can address knowledge management issues:

1. *"the vision of knowledge as a simple stock resulting from the accumulation of information in a linear process*;
2. *the hypothesis that any form of knowledge can be made codifiable*;
3. *the vision that knowledge is limited to individuals*;
4. *the idea that knowledge is limited to something that people possess"* (Amin and Cohendet 2004, p. 17).

In the present paper, it is proposed to adopt the "pragmatic" epistemological approach (Pierce 1978, Dewey 1938) I have been using to develop a theoretical psycho-socio-economic framework for transactional action analysis. After presenting this theoretical framework, I will introduce the following new analytical categories, which provide means of correcting the misconceptions pointed out by Amin and Cohendet: the distinction between the knowing and the known, the various forms of tacitness resulting from compilation, volatility or confinement and the diverse remedial knowledge management strategies available, such as conscientizing explicitation, documentarization, theorizing abstraction, deductive standardization and

paradigmatic conversion. Lastly, I will take this analysis as a starting-point for discussing the ideas about tacit knowledge put forward by Nonaka and Takeuchi (1997), who seem in my opinion to place too much emphasis on the individual and mental dimensions.

2 Elements of a Transactional Theory of Action

The transactional analysis of action tends to regard activities of many kinds as transactions, regardless of whether they are carried out between separate "persons" or whether they involve one and the same person engaged in an internal dialog. This approach is in line with several theoretical schools of thought in the fields of psychology and social psychology,, such as symbolic interactionism (founded mainly by G.H Mead, 1934) and the theory of activity, a term covering the work of psychologists such as Vigostky (1934) and Leontiev (1981), but which also includes, in the present case, that of linguists such as Bakhtine (1977). Contrary to what is generally held to be the case in the field of economics, transactions are not only commercial and contractual activities, but can be defined as activities generating new material and/or semiotic forms which are mediated by a wide range of media including the physical environment, malleable objects, and transcription substrates.

The concept of transactions developed by Bentley and Dewey (1949) differs from that of interactions in that it denotes creative encounters as the result of which a new production is created and each of the selves involved has been transformed (according to these authors, interactions do not necessarily involve the production of an original work or the transformation of the selves concerned[1]). For present purposes, we have assumed all creative transactions to lead to the two-fold transformation of both the semiotic or material work and the selves, the contours of which are redefined (Zacklad 2005 and Fig. 1). The self can be either an individual or a collective entity and the transactors can be either separate people or the same person engaged in a kind of internal dialog[2].

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[1] In many of the approaches to which symbolic interactionism has led, interactions have been taken to correspond to a creative transaction where the selves are transformed by the exchange. The transactional theory of action can be viewed on these lines as an extension of symbolic interactionism, and creative transactions as forming a sub-set of the interactions described in this context. Reverting to Dewey's original expression has enabled us to develop a number of specificities which symbolic interactionism did not bring to light, by focusing on the structure of relations based on producer/beneficiary (or client/supplier) logics (although the roles are liable to be quickly reversed) and especially, on the production of works of a technical or institutional kind which will be perpetuated far beyond the meetings in question, which it is indispensable to take into account in analyses of this kind.

[2] The word "dialogue" is used here in the broadest sense: to cook a good meal for oneself is also a transaction.
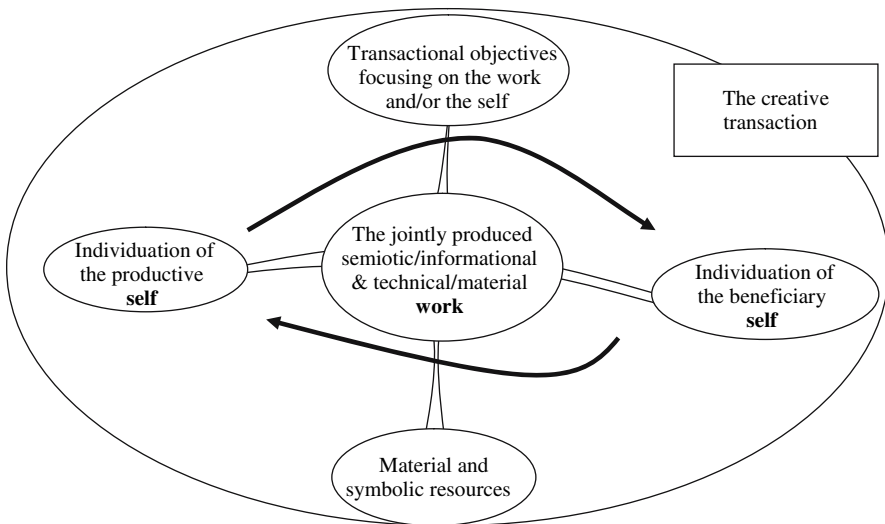
Fig. 1. Diagram of the components of a creative transaction. The roles described here correspond only to the initial phase. In a complete transaction, the beneficiary self responds by adopting a symmetrical position conducive to joint semiotic production

All non-automatic, non-routine actions will involve at least two transactors, who intentionally respond to a need by putting together a work or a production. Transactions are therefore always bound to be mediated. The validity of the productions to which they give rise is attested by the fact that they are consumed or used in some way, either quasi-immediately or after some time has elapsed, depending on how closely located the two selves are in space and on the perenniality of the medium used to convey the productions (Fig. 1).

Transactions take place in transactional situations: these situations influence the transactions, and *vice-versa*. Transactional situations include the following components:

- the transactors: one or more producers and one or more beneficiaries consisting of individual or collective selves;
- the parameters of the transactional situation, according to the acceptation of this term in the field of pragmatic discourse analysis (parameters such as common objectives, the social relations between the producers and the beneficiaries constituting the selves, the specific spatio-temporal framework and the environmental setting, the resources available, etc.);
- the productions conveying semiotic contents to the beneficiaries via a material substrate which has been transformed by the producers for the benefit of the receivers (cf. the definition of knowing below).

2.1 Regulatory Semiotic Productions

In the particular case of semiotic productions, a distinction can be made between two kinds of works, which can play different roles in transactional activity. Some works are destined for third parties, whereas others are intended for the producer himself as means of regulating his own transactional activities. In the context of a collective self, the distinction between productions, depending on whether they are intended mainly for internal or external use, rests on the distinction between transactions carried out within a network of participants pursuing similar goals in one or several common fields (whereby they construct a common collective self) and transactions between more distally positioned transactors who nevertheless have similar interests in common[3]. The former might be said to resemble "intra-organizational" transactions, whereas the latter resemble "inter-organizational" ones, for example, those of a commercial kind (although this is only one of the many possible cases).

Regulatory productions, which are often of a semiotic nature, are therefore works intended for a single individual or collective self, who is both the producer and the beneficiary or user at the same time. They either involve relations between selves[4] (inside a collective self) or facilitate the creation of symbolic or material works of other kinds. This distinction between semiotic productions intended for third parties (which are often co-produced with the third parties) and regulatory semiotic productions intended for internal use (which are co-produced with the transactors, forming the collective self) is similar to the distinction made by Schmidt and Simone (1996) between cooperative work and the articulation of cooperative work. It also corresponds partly to the "work organization" concept defined by De Terssac (2003), who extended Reynaud's theory of *régulation autonome* (Reynaud 1989). However, all these authors focus mainly on the regulation of the social relations between transactors (which comes under the heading of self-centered objectives in the present study). In the transactional theory of action, regulation deals also with the characteristics of the work, and hence with the media, at the semiotic/informational or technical/material level.

It is worth noting that regulatory semiotic productions are not always strictly internally generated. Some can be created by other producers and be directly assimilated by the knowing beneficiary. Lastly, all semiotic productions providing resources for internal purposes in transactional activities do not necessarily serve as regulatory principles governing rules or discourse[5]. Some of them are used in various ways to develop those aspects

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[3] See in particular the details of the FANA (Fusion, Articulation, Negotiation and Alliance) model dealing with all the possible configurations, in (Zacklad 2005).

[4] Thus constituting an internal self inside the collective self.

[5] Rules result from a process of deductive standardisation, and discourse from a process of theorising abstraction (cf. below).

of the self involving more subjective feelings of pleasure and other emotions, such as those elicited by artistic semiotic works (singing a song, for example).

2.2 Self-Centered and Work-Centered Objectives and Synthetic or Analytic Approaches

Since the aim of all transactions is to transform a medium for the production of a work and to gain the self-satisfaction deriving from the process of individuation and the acquisition of new social and cognitive skills,[6] these two objectives are bound to be interdependent. However, depending on the context, the mode of regulation underlying this activity will give priority to either self-centered objectives or work-centered objectives. This opposition constitutes our first analytical category.

Secondly, the distinction can be made between transactional activities that make it possible to acquire specific skills for directly transforming media and selves using a design in the context of a design oriented approach, and transactional activities that make it possible to understand more clearly the factors on which action depends from a more general point of view. I have called the former type of approach synthetic, since the emphasis is placed in this case on developing artifacts (and symmetrically, on using or consuming them) and on the skills required for these purposes.[7] I have called the second approach analytic, since the emphasis is placed in this case on understanding the factors responsible for situations and defining the rules or laws they obey, rather than focusing on designing symbolic or material artifacts.

Performing any action requires bringing both of these approaches into play alternately: to pilot work on efficient, functional lines, it is necessary to perform explanatory analyses, whereas understanding situations in depth requires having gained experience of the successes and failures of previous design projects. Depending on which of these approaches is used, the final goal will therefore be said to be either analytic (based on a more contemplative attitude) or synthetic (based on a more practical kind of attitude). These approaches also correspond to different regulatory paradigms.

If we cross these two dimensions, self-centered vs work-centered and the analytic vs synthetic approaches, we obtain four large classes or paradigms (which one might call poles of attraction defining a space within which many different hybrid paradigms can evolve). These regulatory paradigms define the JATE[8] matrix (Table 1). To obtain a finer analysis, it is also possible to refine the issue of self-centered or work-centered objectives by breaking down the objectives in the self-centered case into *social* or *cognitive* and in the

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[6] Social skills include authority and sympathy, whereas cognitive skills include sensori-motor, affective and intellectual skills (cf. below).

[7] In line with H.A. Simon "Sciences of Artificial" (Simon 1996).

[8] In (Zacklad 2005), the approach was slightly different: in that study, the objectives were crossed in the SEPI matrix with the level of reflexiveness.

Table 1. JATE – The Four Classes of Regulatory Paradigms

Approach Focus	Analytic (descriptive and comprehensive processes)	Synthetic (prescriptive and design oriented)
Self-centered objectives	Anthropic	Legal-Psycho-Managerial
Work-centered objectives	Epistemic	Techno-Instrumental

work-centered case, into *material* or *semiotic*, which yields a set of eight issues (Table 2). Each of these issues can then be matched with the corresponding scientific class of problem, in terms of specific scientific disciplines (although the scientific approach is not in fact the only possible basis for defining underlying regulatory principles). Table 2 gives the breakdown based on scientific disciplines, and Fig. 2 gives the orientations of the regulatory procedures, using the same symbols as those used in Fig. 1.

Table 2. JATE – Examples of The Scientific and Technical Disciplines Associated With Various Types of Regulatory Paradigms

Procedure The focus	Analytic (descriptive and comprehensive)	Synthetic (prescriptive and design oriented)
Self-centered objectives	**Anthropic**	**Legal-Psycho-Managerial**
Social skills (and identities)	Social sciences dealing with the determinants of collective action (sociology, history, economics, anthropology, philosophy, law principles, human geography, etc.)	Social sciences dealing with practical modes of regulating collective action (management, applied law, applied social psychology, etc.)
Cognitive (sensori-motor, affective, intellectual) skills	Human sciences dealing with the determinants of skills and learning processes (cognitive psychology, the ergonomical psychology[9] and development, psycholinguistics, etc.)	Human sciences dealing with practical modes of using cognitive skills: pedagogical methods, applied clinical psychology, ergonomics, human resource management, etc.

Table 2. (continued)

Procedure The focus	Analytic (descriptive and comprehensive)	Synthetic (prescriptive and design oriented)
Work-centered objectives	**Epistemic**	**Techno-Instrumental**
Symbolic aspects	Describing "languages" and the underlying principles: linguistics, history of art, mathematics, philosophy, etc.	Applied Art in the widest sense (content engineering, grammar and prescriptive rhetoric, technical design, modeling methods, medical semiotics, etc.)
Material aspects	Science of materials (physics, astronomy, geology, chemistry, biology, etc) with a descriptive approach (finding the laws of nature).	Engineering sciences dealing with materials (medical and pharmacological techniques, mechanical, chemical, biological and civil engineering, computer and electronic engineering, etc.)

2.3 The JATE Matrix of Regulatory Paradigms

Legal-Psycho-Managerial Paradigm: regulatory rules and discourse have self-centered objectives: the receivers benefit in terms of the use they make of the work, and the producers benefit in terms of the satisfaction they feel when the outcome nicely meets the requirements as well as the internal production criteria. This paradigm involving a synthetic approach is based on the use of prescriptive rules and discourse, and the goals of the transaction tend to be more design oriented. The objectives are social (reputation, responsibility, property, etc.) and cognitive, in the broadest sense of the term (satisfaction and well-being, understanding and intelligence). Regulatory rules and discourse link up with current research on action in the human and social sciences,[10] and in the fields of law (rights, obligations, duty, legitimacy, property…), psychology

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[9] Ergonomics (which deal with legal-psycho-managerial matters) differ from ergonomical psychology (Hoc & Darses 2004), since the latter places more emphasis on the interdependence between cognition and professional activities at the most fundamental level.

[10] See, for example, "Sciences of Design" according to Simon (1981), which ranges from pedagogical methods to civil engineering, but the modes of the relations with "objects" naturally differ in each case.
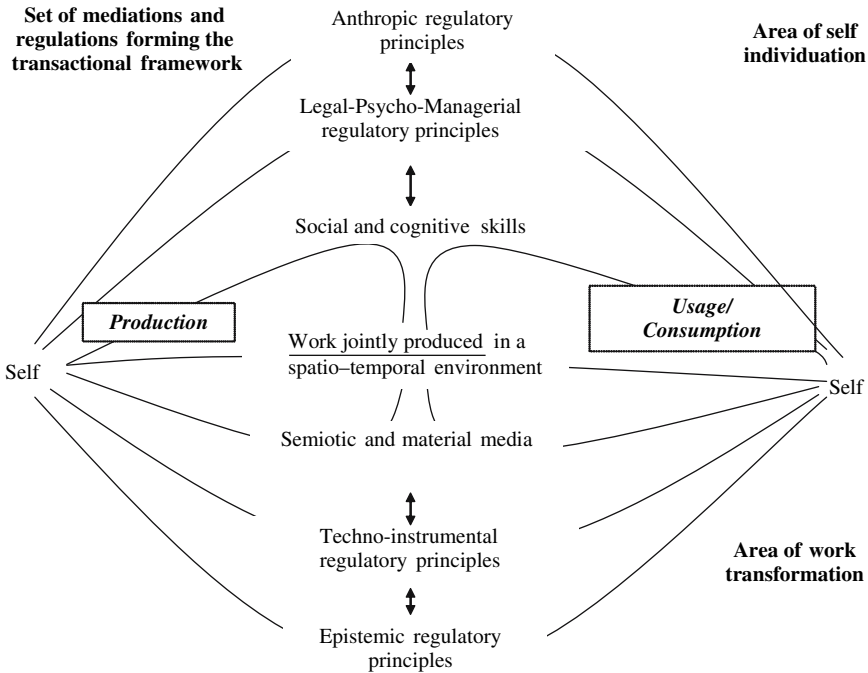
Fig. 2. JATE - Orientation of the various types of regulatory paradigms

(motivation, expectations, representations, understanding. . .), management studies (responsibility, incitation, reputation, delegation, strategic positioning, performance, etc.) and politics (representativity), for example.

Anthropic Paradigm: the rules or regulatory discourse are also centered on the selves and their productive and consummatory activities. However, since these rules involve an analytic approach, they are oriented rather toward describing situations and their determinants so as to establish the underlying laws. They can be in line with the same disciplinary approaches as those mentioned above (law or psychology,, for example), but from a less prescriptive angle. They also link up with topics addressed in other disciplines such as sociology (identity, membership, social norms, justification, forms of organizational regulation, etc.), history (tradition, culture, civilization, etc.) and economics (macroscopic regulation, sectorial analysis, etc.).

Techno-Instrumental Procedures: the rules and regulatory discourse belonging to this paradigm focus on the attributes of the work produced and on their coherence in the framework of a set of closely related works. When the approach is synthetic (prescriptive and design oriented), this category includes all the sciences of design making it possible to produce and analyze the medium involved in the transactions at the symbolic or material level. At the symbolic level, these issues link up with disciplines bearing some

relation to art in the widest acceptation of the term, including literature, rhetoric, music, graphic art, dance, architecture, urbanism, industrial design, the functional analysis of industrial systems and services, medical semiology, etc. At the material level, the links are with disciplines such as the branches of engineering providing means of implementing applied art projects: these range from medical techniques to computer engineering, via civil engineering, biological engineering and printing techniques.

Epistemic Paradigm: this paradigm is based on an analytic approach and therefore tends to be fairly descriptive and comprehensive. At the symbolic level, it includes disciplines dealing with the systems of language and the underlying linguistic, philosophical and mathematical principles, as well as other disciplines such as the history of art and epistemology. At the more material level, they include the many disciplines dealing with the physical, chemical and biological properties of the substrates conveying symbolic contents, which are not viewed from the engineering angle, but in the hope of finding laws accounting for the phenomena observed.

3 Knowledge Management: Tacitness of the Known and the Knowing

The question as to what status knowledge should be given in transactional theory of action cannot be addressed without giving some thought to tacit knowledge, which has rather paradoxically been said by some authors to be one of the most crucial forms knowledge. The concept of tacit knowledge, which was introduced by Polanyi (1966), gained increasing popularity as the result of the studies published by Nelson and Winter (1982) in the field of economics and those of Nonaka and Takeuchi (1997) in the field of management science. Nelson and Winter explained company performances in terms of the ability to use routines which have become automated, as defined in cognitive psychology. This introduces the idea of tacitness, which is particularly difficult if not impossible to detect, describe and isolate from the context.

There has been a great deal of debate on the question as to whether knowledge is intrinsically or necessarily tacit (as Nelson and Winter claimed), or whether all knowledge can be potentially codified if sufficiently large efforts are made to formalize it (as suggested by Cowan and al. (2000), who belong, according to Nightingale (2001), to the "strong codification" school of thought). However, as Polanyi has pointed out, there exists no explicit knowledge which is not rooted in tacit knowledge: "*Hence all knowledge is either tacit or rooted in tacit knowledge. A wholly explicit knowledge is unthinkable.*" (Polanyi, 1969 p. 144). As Rammert (2004) has explained, Polanyi's idea is that any new explicit knowledge which develops entails the concomitant development of associated tacit knowledge, of which scientific research itself makes considerable use.

Without taking sides at this stage in the debate, I suggest making a two-fold change of perspective. First of all, the tacitness of knowledge seems to raise various questions about the causes and the effects. Rather than adopting any conclusive opinion about tacit knowledge, it seems to be more appropriate to put forward the more relativistic idea that knowledge is to some extent tacit, but not intrinsically so: it is tacit only under specific conditions and in specific contexts. Secondly, I have decided to replace the term "knowledge" by the more complex concepts "knowing and known": both of these categories are liable to be tacit in some ways, but according to significantly different modalities.

3.1 The Knowing and the Known

In agreement with Dewey and Bentley (1949), I would say that "knowledge" is a particularly polysemic, ambiguous term. The substitute terms used by these authors, mainly in the framework of the semiotic activities of the subject, are those I have adopted here: the *known*[11], facts established as the result of a transactional process (which can be regarded as a process of inquiry) and the *knowing*[12], which denotes the active phase in the transformation of the environment, in the naming of things by the subject, which does not leave the transactors unchanged (a transaction[13] being by definition a process of mutual transformation between the situation and the transactors).

In the framework of our transactional approach to action, I will therefore adopt these two terms. I have defined **the known** as the *valid product of a transactional activity transformed into a <u>resource</u>*[14] *for carrying out further transactions, taking the form of either a "work" (when the media used are*

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[11] "*Known: Environmental phases of transactionally observed behaviors. In the case of namings-knowings the range of the knowns is that of existence within fact or cosmos, not in a limitation to the recognized affirmations of the moment, but in process of advance in long durations*"(Dewey & Bentley 1949). One way of understanding this definition of the known is to take it to consist of the components of the transactional situation which co-determine the transaction process without depending directly on the short-term actions of the transactors, but which are the naturalized outcome of their past actions.

[12] "*Knowings: Organic phases of transactionally observed behaviors. Here considered in the familiar central range of namings-knowings. The correlated organic aspects of signalings and symbolings are in need of transactional systematization with respect to namings-knowings*" (Dewey & Bentley 1949).

[13] "*Transaction: The knowing known taken as one process in cases in which in older discussions the knowings and knowns are separated and viewed as in interaction. The knowns and the named in their turn taken as phases of a common process in cases in which otherwise they have been viewed as separated components, allotted irregular degrees of independence, and examined in the form of interactions*" (Dewey & Bentley 1949).

[14] Cf. in particular, Billaudot (2004) on the product-into-resource conversion process aspect of economic activity.

external ones) or a "self" acquiring a better level of individuation (by acquiring recognized cognitive and social skills).

The knowing corresponds here to a set of *interdependent transactional activities, the objectives of which focus on both the work and the self in a given situational framework.* If we extend the definition of the transactional situation given above, the *transactional framework*[15] can be said to have the following components:

- a *network of transactors consisting of several individual or collective selves having specific cognitive and social skills,*[16] *who are linked together by their common transactional commitments,*[17]
- *and meet up on a spatial or virtual territory defining the spatio-temporal constraints imposed on these encounters and the access to resources;*
- *using these instrumental, convertible, energetic and motivating resources (inside a territory) in some way, focusing on either the material (technical or "basic material") or the symbolic (informational or semiotic) aspects;*
- *its activities are regulated by rules or discourse (constituting the symbolic regulatory resources) defining the relations (contractual, hierarchic, etc.) between the transactors, the modes of access to resources, the modes of transformation (design) and of reception (usage or consumption) of these resources;*
- *for the purpose of producing works and selves in keeping with the transactional objectives by transforming a medium (convertible resources) and developing the requisite cognitive and social skills in the transactors (the work and the selves being liable to constitute new resources in another knowing activity, where they will be transformed into a "known").*

According to the transactional theory of action, in cases where the known is tacit, the products of some transactional activities do not constitute resources which can be easily used by performing further activities within either the same transactional framework or a different one. The transactions can be successful without their products being easily re-usable in further

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[15] The transactional framework corresponds to the parameters shared by several similar transactional situations.

[16] When a network of transactors constitutes a collective self (when several individuals set up interdependent relations), it can become a "social world" as defined by Strauss (1993), with whose work we have not made any systematic comparisons here. We often speak, however, about a "community" to designate a network of collective transactors, where several individuals make mutual commitments.

[17] Contrary to what occurs in the case of "social network" models, it is not the frequency of the interactions which defines the network of transactors, but their commitments, which can sometimes be made by representatives of the transactors themselves.

transactions. The work produced can be too local, for example, to lend itself to being re-utilized. To solve this problem of product-into-resource conversion, special investments have to be made in the management of the known. This transformation is all the harder to perform as the products of the other transactions are carried out later in time or by a heterogeneous network of transactors.

The knowing also includes many tacit aspects, not only from the point of view of an external observer, but also from that of the transactors involved. The tacitness of the knowing is rather problematic when its potential for action, and hence its capacity to produce works is put at risk. The tacitness can reside in the various components of the transactional situation, the network of transactors involved, the characteristics of the territory, the type of resources, and the rules and regulatory discourse adopted. Changes in one or other of these components (a change of territory, changes in the network of transactors, the disappearance of resources of some kinds, etc.) can actually jeopardize the knowing.

3.2 Typology of the Forms of Tacitness

The tacitness of the knowing and the known can depend on various factors, which need to be differentiated because they require different management strategies. These strategies, which are based on the main knowledge management strategies used by practitioners and/or mentioned in the literature in the fields of information science, management science, knowledge engineering and ergonomical psychology,, can be applied *a priori* to issues concerning both the known and the knowing, although the meaning of tacitness probably differs slightly from one issue to another. The tacivity can result from:

- the **compiled** nature of the knowing resulting from the automation of the transactional activities;
- the **volatile** nature of the known resulting from lack of investment in the final or intermediate products;
- the **confined** nature of the knowing and the known resulting from the difficulty of extending the activity of the knowing and that of conveying the known to other territories and other transactors.

4 Remedial Strategies for Dealing with Compilation and Volatility

4.1 Compilation: The Conscientizing Explicitation of Automatisms and Routines

The compilation of transactional activities, which is one of the most frequently addressed issues in knowledge management studies, is due to the fact that for

the transactors themselves, both the works produced and the transactional framework in which the knowing occurs are implicit. Compilation results from the automation of a whole chain of transactions and micro-transactions, where the regulatory principles underlying the activity are rarely explicitly stated,[18] in terms of the identity of the transactors involved, the relationships between them, the characteristics of the territory, the nature of the resources mobilized and those of the work produced.

The corresponding knowledge management strategies are knowledge elicitation strategies which lead the transactors to view their practices more objectively and reflexively so as to bring to light the underlying "rules." These rules, or discourse, can bring to bear on various components of given transactions:

- the <u>technical resources</u> (instrumental resources, for example) and the exact know-how required to use them, which can be defined more clearly;
- the <u>transactors</u> can be seen, for example, to form a relevant community of practice (a network of transactors);
- the real value of the <u>intermediate productions</u>, constituting necessary steps toward creating the <u>final end-product</u>, which can be properly recognized;
- and the <u>skills</u> mobilized and developed by the transaction, which can be properly defined, making the professionality required to perform the transaction show up in a new light.

4.2 Volatility: "Documentarization" Strategy and Organizational Memory

The question of the volatility or forgettability of the transactions is of a different kind from the compilation issue. In the case of forgettability, a work produced may have been clearly perceived as such, and may not necessarily have been produced by performing a chain of automated operations. However, for various reasons, the most common of which is temporal dispersion, the work or the intermediate product is in some way lost to the producers as well as to the beneficiaries. Even if it has not been lost for good, attempting to bring it back into sight can seem to require too much effort to be worthwhile in comparison with adopting alternative means.

One of the reasons for the volatility of the known is the ephemeral nature of the substrates on which semiotic productions are based. This can be so, for example, in the case of discourse which has had useful effects but which, since it has not been retranscribed, has been partly forgotten by the transactors. In this case, having recourse to techno-informational instruments making it possible to record or retranscribe the whole semiotic production process can certainly be worthwhile. In some cases, however, even in the presence of a long-lasting substrate making "substitutive mediation" of the transaction process

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[18] Each set of regulatory principles constitutes one of the paradigms included in the JATE matrix.

possible (Zacklad 2004b, 2006), the most valuable fragments of the semiotic content cannot be readily extracted from the body of the content (single sentences from a long text, for example).

"Documentarization" provides a useful strategy here. This procedure consists of endowing long-lasting substrates with *"specific attributes which can be used to facilitate (i) their management along with other substrates, (ii) their physical handling, which is essential to be able to navigate at the semantic level within the semiotic contents, and (iii) guiding not only the receivers, but also the producers themselves around the substrate by drawing up one or several maps of the semiotic contents as an aid to semantic navigation* (Zacklad 2004b, 2006). When the substrate is a digital one, various techno-informational instruments are also available to assist transactors in their search for the contents they require. A large proportion of document oriented knowledge management strategies based on information technology and knowledge engineering are based on methods of this kind.

The volatility of the known can sometimes be detrimental to intermediate productions in the context of a changing transactional framework: project structures can dissolve, internal restructuring can occur, and territories can shift. Various knowledge management strategies can be used in these cases. In the field of "rational design" (Moran & Carroll 1996), for example, it is proposed to re-trace the series of arguments which led to a decision being reached at committee meetings and to schematize this process in graphic terms. The idea here is not just to find the end-product but to also bring to light the process involved, so as to define the intermediate stages and the decisions (intermediate productions) as well as the players involved. Methods along these lines have been extended so as to be able to identify the transactors and the roles they play in decision-making processes (Lewkowicz & Zacklad, 2000, Bekhti et al. 2001). When forgettability is about the competences of the members of the organization for similar reasons to those given above, it can be worth drawing up internal "yellow pages" of internal skills (Cahier et al. 2001).

5 Confinement of the Knowing and the Known

Confinement is the lack of "transferability" of a known or a knowing from one territory to other larger territories, or from one community of practice forming a network of transactants to other broader communities. The spatial and social aspects of this problem are often interdependent: exploring a new territory means making new encounters, and meeting new transactors means exploring new territories. When the known is confined, it can constitute a resource within a given territory for a given community, but it cannot be easily exploited in other contexts. When the knowing is confined, transactional activities can be carried out in a given local setting by a given community,[19]

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[19] Or for a given individual self.

but coordination problems are bound to arise when it is proposed to extend these activities to include other transactors or to relocate the transactions Fig. 3.

There are other issues underlying (and often also resulting from) that of territorial and social extension: they focus on new resources, new forms of regulation, etc. The difficulties associated with the confinement of the known and the knowing are of the kind encountered in industry and service[20]: the development of new forms of coordination between entities as the result of restructuring, the transfer of know-how to customers, the integration of new members, some of whom may have been relocated, and at a more mundane level, the retirement of colleagues can also destabilize a community, as can the transfer of a business to a different environment.

When knowledge management comes up against confinement problems (managing the transformation of a small community occupying a small territory into a large collective occupying a larger territory, for example), it has to deal, in terms of transactional theory, with the *spatio-socio-temporal distribution of transactions* (Zacklad 2004b, 2006), using suitable remedial coordination strategies. Because of the way in which the knowing activities are distributed, the producers and beneficiaries of transactions sometimes do not occupy the same spatio-temporal framework. The intermediate productions therefore have to be given a more long-lasting form so that the transaction can be initiated, interrupted, updated and repeated in all the configurations involving the presence and/or absence of the beneficiaries and the producers. On the other hand, in some contexts, other producers and beneficiaries can sometimes replace those who initiated the transaction and take over their role(s), providing social means of extending the transaction.

The distribution of the known corresponds to the distribution of production in the economic acceptation of these terms. The question of distribution links up with the above-mentioned distinction between transactions taking place within a single collective self and those involving more distal transactors sharing similar interests.[21] The question of the conversion of products into resource as far as the distribution of the known is concerned arises mainly in the second case, because the conditions under which the work is produced involve less proximity with the potential beneficiaries or less commitment to the transaction on their part. These issues have often been addressed in studies on the sociology of innovation rather than knowledge management studies.[22]

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[20] See for example (Du Tertre 2001) on the provision of services of an immaterial and relational kind, which are strongly involved in creative transactions.

[21] Or when a work which has been produced through an internal dialogue between the creator and himself is to be presented to an external audience.

[22] See, for example, the question of setting up socio-technical networks in Latour (1989) or translation networks in Callon (1986).
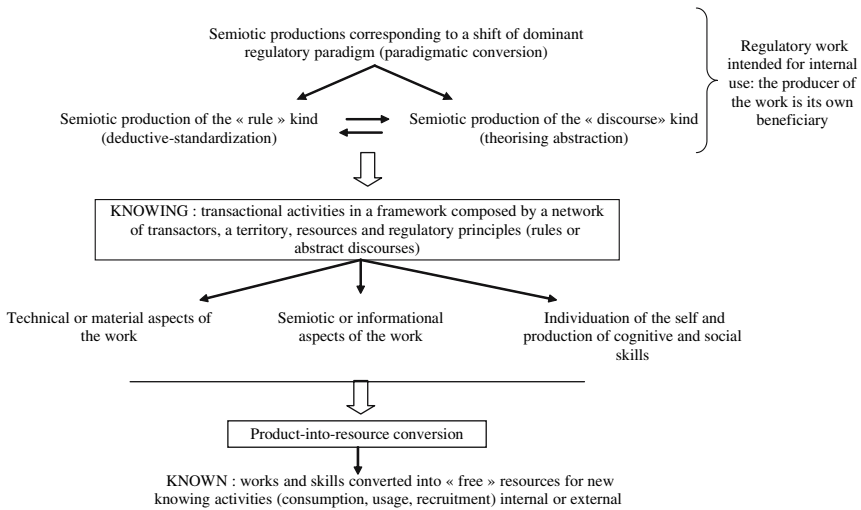
Fig. 3. Semiotic productions associated with the regulation of the knowing

5.1 The Typology of Knowledge Transferability Strategies (Dealing with Confinement)

In (Zacklad 2006) eight prototypic strategies were described for coordinating distributed communicational transactions, such as documentarization and the intensified use of techno-informational equipment. I will now present three new "knowledge transferability" strategies relating to the distribution of the knowing and the known in heterogeneous territories and communities, in addition to the conscientizing explicitation and documentarization strategies already described above (which can also be useful in the framework of confinement problems, but which are not directly relevant to this issue[23]). These strategies are not exactly equivalent to those previously described (Zacklad 2006), especially as coordination strategies are also suitable for use in situations where the pattern of distribution of the transactions is of a less

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[23] The links between the eight coordination strategies presented in my paper on "documents for action" (DofAs; Zacklad 2006) and the present knowledge management strategies are as follows: (1) standardising transactional situations corresponds to the deductive standardisation of the knowing, (2) mnemotechnic ritualisation corresponds to the opposite operation to conscientizing explicitation, (3) formalising rules of expression corresponds to the deductive standardisation of works of a semiotic kind, (4) abstraction of semiotic contents corresponds to theorising abstraction (5) substitutive mediation, (6) documentarisation, (7) the intensified use of technico-informational equipment and (8) substitutive coordination correspond to the prerequisites for extending documentarisation in the ways suggested here (via the substrates of semiotic works). Paradigmatic conversion has no equivalent (it corresponds to the "change of epistemic focus" mentioned in Zacklad 2004a).

intense kind than that observed in knowledge management situations, and the problems which arise relate only to works of a semiotic nature.[24]

The three main types of knowledge transfer strategy are (1) *deductive standardization*, (2) *theorizing abstraction* and (3) *paradigmatic conversion* strategies. In all three cases, the approach consists of describing some of the parameters of the transactional framework more explicitly, or in other words, making the transactors more aware of these parameters via the semiotic productions involved and the representations they elicit, although they are liable to revert to being subsequently more implicit as the result of the automatizing-routinizing processes. These three strategies require the making of semiotic productions such as rules for *normalization and standardization* and discourse for *theorizing abstraction* purposes. *Paradigmatic conversion* also includes discursive productions intended to justify changing the main regulatory paradigm used to perform a given knowing activity.

6 Deductive Standardization and Theorizing Abstraction Strategies

All transactional activities transform a medium (design of the work) with a view to having effects on the transactors (design of the self). A medium has two important aspects: the symbolic (semiotic or informational) aspect corresponding to the "symbolic effects"[25] and the material (technical or basic material) aspect corresponding to the "energetico-libidinal effects."[26] Via its material composition, a medium acts as a <u>substrate</u> for the semiotic and communicational content, thus facilitating the operation of the symbolic effects intended by the producer. Conversely, via its symbolic nature, the medium will serve to <u>express</u> the material aspects, thus facilitating the production of the energetico-libidinal effects intended by the producer.[27]

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[24] Involving mental operations and representations associated with intellectual or aesthetic matters.

[25] Involving thought processes and the subsequent mental representations associated with intellectual or aesthetic issues.

[26] At the level of motor activity and motion, food intake, muscle potential and sensory amplification, protection, sensations of comfort and wellbeing, sexuality etc.

[27] This reciprocity in communicational transactions may seem rather paradoxical, since it suggests that the sign is intended to promote the energetico-libinal effects of the substrate. However, from the pragmatic point of view, any language act is performed for perlocutory purposes including both the symbolic effects (mental thoughts, representation, etc.) and the energetic-libidinal effects (pleasure, displeasure, excitement, motility, etc.). Since all communicational transactions require a material substrate (sound vibrations, sheets of paper, etc.), the form of expression (the "meaning" conveyed) can be said to also be intended to appropriately orient the energetic-libidinal reception of the gestures

These regulatory principles can therefore apply either to the work at the symbolic or material level or to the self, thus transforming individual social and cognitive skills (cf. Fig. 4). The effects on the self can be distinguished in turn depending on whether they result from productive or receptive activity.
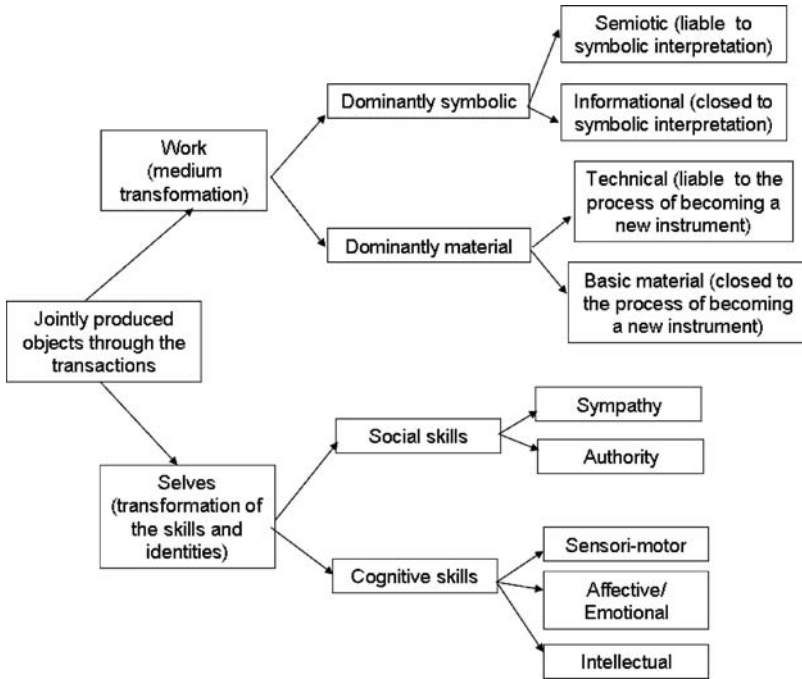
Fig. 4. Types of (co)-productions in a creative transaction

Table 3 gives some examples of regulatory discourse focusing on the semiotic or technical aspects of the work and on the effects produced on the selves of the transactors in the framework of creative knowing activities such as "cooking a good meal," "organizing a brainstorming session," "drawing up a digital document," "making a new tool," "dispensing physiotherapy care" or "diagnosing a disease." If one views these regulatory semiotic productions as discourse, they can be seen to have a general scope, whether they yield a theory in the scientific sense, a methodology in the technological sense, or a mythic narrative.

These productions all result from the *theorizing abstraction* activities we will deal with below. They can also take the form of "rules," or regulatory

shaping the substrate in order to elicit the feelings intended by the producer. Since communicational transactions are mainly semiotic, their symbolic function predominates rather than their material function, unlike transactions such as those involved, for example, in assisting the task of moving a heavy object.

Table 3. Some Examples of Regulatory Discourse in Various Fields

Type of object with which the discourse deals	The work		The self
Type of knowing activity	Regulatory discourse about the semiotic aspects of the media (the expressive function of the material dimension)	Regulatory discourse about the technical aspects of media (the substrate function of the semiotic dimension)	Regulatory discourse about the cognitive and social effects on the selves of the transactors: beneficiaries (B) and producers (P).
Cooking a good meal (the technical aspects predominate)	Description of the occasions on which the dish is prepared and the cultural and gastronomic aspects	Description of the ingredients, the visual and gustatative aspects, the steps involved in cooking the dish, etc.	B: the nutritional, gustatative and social effects on the selves – P: the cooking skills and their recognition
Organizing a brainstorming session (the semiotic aspects predominate)	Description of this type of meeting, from the point of view of the objectives, the stakes, the method of chairmanship used, etc.	Description of the type of meeting from the point of view of the location of the participants, the substrates available, the time allotted to each speaker, etc.	B: the intellectual, affective, and social effects on the participants P: the chairmanship skills and their recognition
Drawing up a digital document (the semiotic aspects predominate)	Description of the rhetoric objectives, the type of arguments to be used, the length, the style, the terminology, etc.	Description of the software program to be used, the format, the means of access, the typographic options, the numbering, etc.	B: the effects on the reader at the intellectual, emotional and social levels P: writing skills and their recognition
Producing a new tool (the technical aspects pre-dominate)	Description of the purpose of the tool, its design, its ergonomics, etc.	Description of the dimensions of the tool, the arrangement of its components, its physical interactions with the substrate and with the user, etc.	B: effects on the user in terms of the potential for action and the social aspects, etc. P: engineering skills and their recognition

<div align="right">(continued)</div>

Table 3. (continued)

Type of object with which the discourse deals	The work		The self
Dispensing physiotherapeutic care (the technical aspects predominate)	Defining the gestures and words required to set up a restorative and preventive relationship with the patient	Defining the gestures required to create physical interactions with parts of the patient's body, their intensity, force levels, etc.	B: effects on the patient who is the beneficiary at the sensory and psychological levels – P: therapeutic skills and their recognition
Diagnosing a disease (the semiotic aspects predominate)	Defining the semiology of the symptoms viewed as a form of expression of the disease	Defining appropriate perceptual and exploratory gestures, possibly using various instruments, etc.	B: intellectual and emotional effects on the patient who is the beneficiary, and/or on his family – P: therapeutic skills and their recognition

semiotic productions which can be both more local and more normalized or standardized, depending on the situations to which they apply. The generation of "rules" of the kind we are talking about here results from *deductive standardization* activities, which have been given this name because they consist of applying theorizing discourse to specific situations (Table 4 shows how general regulatory discourse can be transposed into regulatory rules for preparing a meal and drawing up a document).

6.1 Abstract Discourse Versus Rules

Theorizing abstraction and *deductive standardization* can be said to be opposite operations. Operations of the first kind start with a series of local rules and yield a systematic, all-inclusive regulatory type of discourse (scientific theories, technological methodologies and mythic narrative, for instance), whereas those of the second kind start off with theories and use them to deduce more directly usable rules rooted in the target situations. Each form of expression (regulatory, theorizing discourse and standardized rules) has its own advantages and disadvantages in terms of their transferability and confinement. In other words, each of them is consistent with some kind of universality, but carries corollary risks of self-enclosure. In the case of

Table 4. Examples of translation into rules in two of the fields featured in the previous table

Rules for preparing a culinary speciality	Rules for classifying dishes and the situations in which they are customarily served in a given cultural context.	Rules governing the preparation of the food and the way the ingredients are combined.	Social rules governing the consumption of the food and the division of the work (design)
Drawing up a digital document	Rules governing the mode of expression: plan, terminology (thesaurus), etc.	Rules governing the formats, the typography, the numbering, etc.	Social rules governing the modes of reading and the recognition of the authors

regulatory theorizing discourse, the risk of cognitive confinement is due to the difficulties involved in appropriating "theories" and the fact they may lead to a rather exclusive picture of things. On the other hand, their abstract nature makes them potentially applicable to a larger number of situations, making for great freedom of interpretation in the implementation of knowing activities. Theorizing discourse is more closely confined at the social level (in terms of the circle of transactors involved) but more widely applicable.

Regulatory rules tend to run the risk of cognitive confinement because they are too concrete to be easily transposable to other situations, or too sensitive to changes in the environmental conditions. In addition, they can seem to be rather unjustified and hence to lack coherence. One of their main advantages is that because of their concrete nature, they are accessible to a large number of transactors and require less interpretative effort. The rules are less potentially creative in this case for dealing with the issues arising in various situations, but they can be more widely distributed at the social level.

6.2 Theorizing Abstraction

Knowledge transfer strategies help to compensate for the disadvantages of each of the forms taken by regulatory principles. The theorizing abstraction strategy compensates for the fact that the "rules" used by the transactors are often perceived as being too numerous and to lack coherence, and for the fact that theories officially recognized in an organization may not seem to be in keeping what is actually practiced. Developing a theory accounting for all situations liable to enhance the potential of the knowing is a project which relates to knowledge management strategies based on organizational learning theories (Argyris & Schön 1974).

In some cases, it can be worth replacing a theory by another more suitable one. For example, Argyris & Schön have suggested that consultants can help actors become aware of the theories in use (which they implicitly apply in their practice) by analyzing them more consciously and realizing that they are often inconsistent with the explicitly espoused theories, and making them change their representations and practices. The important point in this approach is making the knowing realize how it represents its own activity, what regulatory principles it obeys and how systematic these principles are.

Theorizing abstraction is not necessarily very formal. Regulatory procedures of the anthropic or legal-psycho-managerial kind, for example, can take the form of an account of the past history of a collective undertaking, which makes the present activities meaningful. The main point here is acquiring detachment from the rules from the emergence of regulatory discourse of the theorizing kind. These rules generally have a local color which tends to make them rather tacit (their premises are not explicit because of their indexicality). Theorizing abstraction provides modes of collective regulation where the observance of local rules of adhesion is replaced by a more general kind of discourse, which is therefore more easily transposable to situations having similar deep structures (Zacklad 2004).

6.3 Deductive Standardization

In some cases, the systematic use of theorizing discourse leads to the confinement of regulatory principles because they are difficult to interpret. Deductive standardization provides a means of translating high-level principles into concrete situations. This procedure yields the definition of rules, the premises and conclusions of which link up with the tangible characteristics of the transactional framework. Triggering the rules makes it possible to define procedures, and the complementary use of documentarization strategies based on long-lasting paper or digital media will make these procedures publicly accessible (cf. Schmidt & Simone 1996 on the publicly accessible nature of coordination mechanisms).

Deductive standardization also makes it possible to suggest modes of regulation compensating for the cognitive confinement to which abstraction is liable to lead, by placing special emphasis on standards and norms. Using rules of his kind leads to setting up informational infrastructures (Bowker and Star 1999), which induce forms of coordination based on standardization (Mintzberg 1979), which in turn end up by becoming tacit although they initially resulted from deliberately thought-out projects. In the end, the application of deductive standardization can lead to designing quite tangible architectures and instruments which impose material constraints on collective activities, just as the spaces of which buildings consist can either promote or prevent contacts between the occupants, and the functions available in a software program make only some specific data processing operations possible and not others.

Deductive standardization thus makes it possible to remedy some forms of confinement of the knowing by defining universally accessible rules, informational infrastructures and technical devices. As a corollary, it also contributes to enclosing practices in narrowly stereotyped transactional frameworks, from which it will be possible to escape only by undertaking a whole new process of theorizing abstraction prior to introducing new forms of knowledge transfer into unexplored social and territorial domains.

7 Paradigmatic Conversion

As we have seen above, the regulation of knowing activity is a component of one of the paradigms defined in the JATE matrix. Although all knowing activity involves both the production of a work and the transformation of selves, it tends to privilege a type of regulation based on the characteristics of the work in hand and on achieving self-satisfaction, as well as favoring either a synthetic kind of approach (a prescriptive, design-based approach) or one of a more analytical kind (a more descriptive and comprehensive type of approach), depending on the context. The tacitness of the knowing often results here from priority being implicitly given to a specific regulatory paradigm, whereas the transactional situation actually requires a change of paradigm to be made to enable the knowing to escape from confinement.

One could give many examples of knowledge management problems where a change of paradigm should have been made, resulting in various shifts in the JATE matrix:

1) A purely *techno-instrumental* procedure which does not make the *legal-psycho-managerial* aspects of the knowing clearly visible (requiring a type 1 paradigmatic conversion, as shown by the arrow in Fig. 5).

	Approach	Analytic (descriptive and comprehensive approach)	Synthetic (prescriptive and design oriented approach)
Focus			
Self-centred objectives		**Anthropic** 3	**Legal-Psycho-Managerial**
			2 ——— 1
Work-centred objectives		**Epistemic** 4	**Techno-Instrumental**
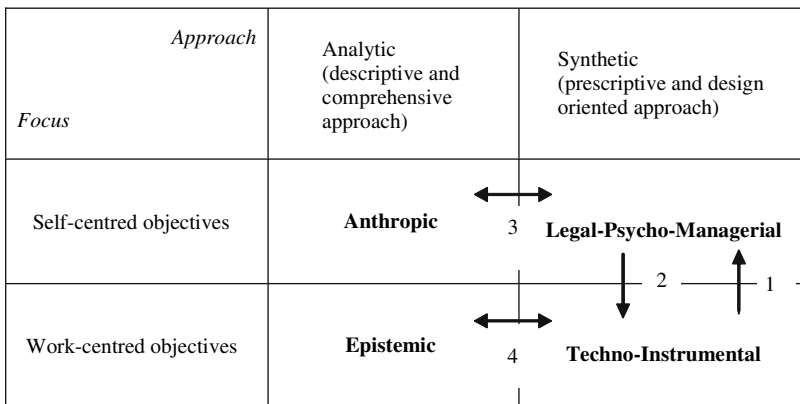
Fig. 5. Paradigmatic conversions required to deal with the examples given above

- Example: in many cases, engineering departments do not manage to grasp the strategic, political and legal implications of the projects on which they are working, which fail although the producers are convinced of their own technological excellence.

2) Conversely, a purely *legal-psycho-managerial* type of regulation which does not take the *techno-instrumental* factors into account (requiring a type 2 paradigmatic conversion).
   - Example: many managers with no training in Information and Communication Technology are unable to grasp how this field contributes to knowing activity within their team (just as many heads of sales departments do not have a sufficiently close understanding of the technical characteristics of the products they market).

3) A *legal-psycho-managerial* type of regulation, which has no idea of the *anthropic* factors involved (requiring a type 3 paradigmatic conversion).
   - Example: managers attempting to apply an exogenous management theory to a group whose cultural background is unfamiliar to them (and *vice-versa*, those focusing on cultural authenticity without perceiving the management and/or legal issues at stake).

4) A *techno-instrumental* type of regulation which overlooks the *epistemic* factors (requiring a type 4 paradigmatic conversion).
   Example: a technical department may not manage to develop an innovative product based on upstream research redefining the problem, which would help to solve recurrent problems or meet the needs of specific customers, (or *vice-versa*, an upstream research department may not be aware of the engineering constraints and therefore unable to transform ideas into innovative products).

Lastly, a paradigmatic conversion can also be said to occur when the main regulatory principles pertaining within a paradigmatic class undergo a radical change, which transforms the nature of the objects under consideration. For example, in the framework of *legal-psycho-managerial* procedure, the shift from a centralized, top-down mode towards a more decentralized, bottom-up one can also be said to be a form of paradigmatic conversion.

8 Conclusion

The next step will be to assess this attempt to revisit the topic of the knowing and the known, by making comparisons with various other theories, such as those developed in the fields of management science and economics. Although I cannot discuss these questions in depth here, it is proposed to conclude the present paper by dealing with one of the specificities of the present approach to knowledge management strategies (which is summarized in Fig. 6). In particular, I do not subscribe to the essentialist picture of tacit
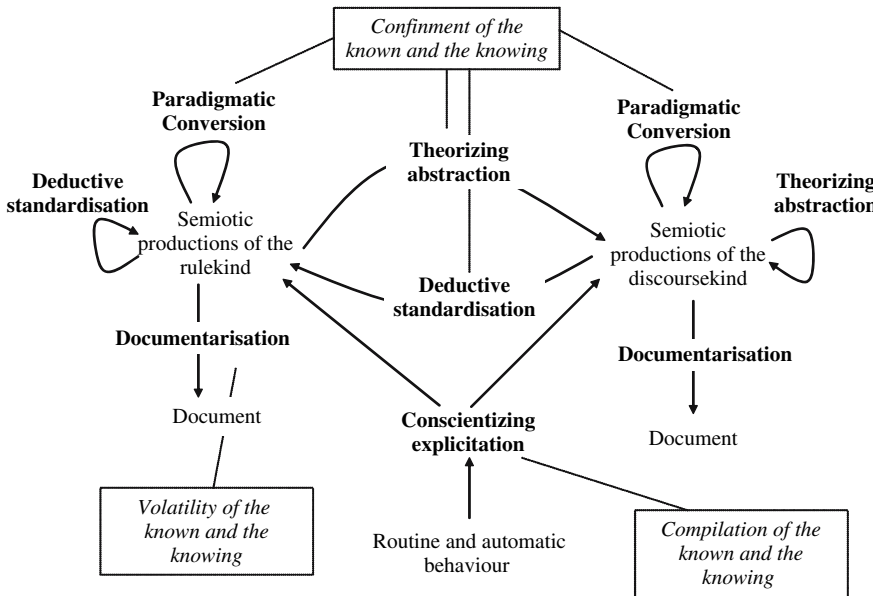
Fig. 6. The five knowledge management strategies presented here

versus explicit knowledge on which the approach adopted by Nonaka and Takeuchi was based (1997)[28]. The latter authors assume tacit knowledge to be an individual matter, whereas the explicitation of knowledge involves a process of externalization and codification, which can be further reinforced by the process of documentarization which enables the players to reappropriate codified knowledge more easily.

According to my own view of tacitness, which is a more relativistic than ontological one, the tacit aspects of the knowing and the known are no more intrinsically individual than the explicit aspects are. It is worth noting that conscientizing explicitation deals first and foremost with the conditions under which sequences of transactions occur, depending largely on collective factors[29]. Conscientizing explicitation is not so much a question of the transition from individual mental learning to collective knowledge, but is rather intended to bring to light the shift from the modes of regulation implicitly underlying actions, especially collective actions, to other modes, where the determinants of the regulation are more explicitly expressed.

This difference between approaches can be illustrated even more clearly in the case of the confinement of the knowing and the known. In the framework

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[28] See also in similar lines Tsoukas (2002) and Day (2005).

[29] Transactions either occur between selves corresponding to separate individuals or apply to the same person engaged in an internal dialogue with himself (see above).

of the present approach, the tacitness of the knowing and the known is held to be problematic only in contexts involving the social or territorial enlargement of transactional objectives (see above on the issue of the tacitness resulting from the product-into-resource conversion which serves as the starting-point for new transactions). The tacitness is therefore not an intrinsic characteristic, but depends on the goals pursued, the network of transactors potentially involved and the characteristics of the transactional framework. As we have seen, depending on the case in hand, the transferability of the knowing and the known, i.e., its explicitation and use in the pursuit of new goals, will require the production of theorizing discourse and standardizing rules, or paradigmatic conversions making it possible to radically transform the actors" perception of the implications and the modes of regulation underlying their transactions.

On the above lines, an alternative path to that proposed by Nonaka and Takeuchi in their theoretical study might be proposed for interpreting the differences between the Japanese and Western styles of knowledge. Rather than stating, as the latter authors have done, that the difference between the two cultures is that Western countries are inordinately fond of explicitness, whereas the Japanese rely more on tacitness, I would say that the difference can be explained in terms of the use of different regulatory paradigms and whether they tend to be more synthetic than analytical, or in terms of the choice of communication modalities within a given type of paradigm: working toward a local consensus or acting out controversies.

As regards confinement, it is precisely because Western scholars have found the regulatory procedures favored by the Japanese difficult to apprehend that they have labeled them as "tacit"[30]. In other words, the modes whereby Japanese organizations function are not in fact more tacit than elsewhere, if one defines tacit as the mental interiorization of rules. However, they may involve the use of regulatory paradigms which, although they are perfectly explicit to the actors themselves, have yielded modes of organization giving these communities greater local autonomy than firms in Western countries usually enjoy: a point which seems to have escaped members of the "business school" attempting to define the official Japanese doctrines accounting for innovation processes[31].

Lastly documentarization does not systematically transform tacit aspects into explicit ones. Its purpose is to combat the volatility of the known by working on the media so as to permit the subsequent use of semiotic productions. However, despite the fact that documentarization plays an essential role in facilitating access to distal transactions and preserving the

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[30] According to me Nonaka and Takeuchi are quite in line with Western managerial and psychological theories (see their psychological references for example).

[31] A tendency which is now widely recognised in the context of the promotion of "communities of practice," for instance, as previously pointed out by Nonaka and Takeuchi themselves.

history of these transactions for a network of transactors distributed in time and space, it does not suffice to solve the problems associated with compilation and confinement we have been discussing here.

It is worth mentioning in connection with compilation that a statement can appear highly laconic to a receiver who is not familiar with the context, and that preserving this statement on a long-lasting substrate, as occurs in the case of a transcription, will do nothing to change this state of affairs. A similar point can be made about confinement, in that making the semiotic productions resulting from transactions more widely accessible is not the same thing as transforming semiotic contents in response to the needs of audiences other than those for which they were initially intended. This objective can be achieved only via a process of exegesis or interpretative commentary, which can also possibly be associated with new re-documentarization activities yielding a result which differs from the original version.

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Knowing and Indexical Psychology

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Abstract: This chapter has two parts. The first part critiques mentalism in cognitive psychology and Knowledge Management theory's basis in mentalism. The second part proposes a reading of indexical psychology as an alternative to mentalism. The purpose of the chapter is to reposition our understanding of psychological events, including personal knowledge expressions, from a mysticism of private minds and their public representations to a conception of human agency constructing person and self through cultural forms and in social situations. Such an analysis leads to a breakdown of the "inner" and "outer" dichotomy which has formed the basis for much of psychological theory and for Knowledge Management theory (the latter in terms of a dichotomized notion of private knowledge and public mediums for that knowledge's representation). The view proposed here is that psychological research, including research into knowing acts, must begin with the understanding of persons and their selves as dynamically constructed by learning and by experience. In this way, this analysis also is associated with what is sometimes referred to as "activity theory."

1 "The 'Inner' is a Delusion"[1]

Knowledge Management has been plagued by poor and pernicious models of mind and language. Two dominant metaphysical assumptions are involved in these models. The first common assumption is that the term "mind" refers to some quasi-physical space that contains mental or cognitive elements that are then re-presented in public space. These elements, either simple or complex, are known as "ideas" "beliefs" or "knowledge," or even "information," which

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[1] "The 'inner' is a delusion. That is: the whole ideas-complex alluded to by this word is as a painted curtain drawn before the scene of actual word usage." ("Das 'Innere' ist eine Täuschung. D.h.: Der ganze Ideen-komplex, auf den mit diesem Wort angespielt wird, ist wie ein gemalter Vorhang vor die Szene der eigentlichen Wortverwendung gezogen.") (Ludwig Wittgenstein, *Last Writings on the Philosophy of Psychology: the Inner and the Outer*, Vol. 2; translation modified. Thanks to Katy Börner.)

are then viewed as publicly expressed in language. The second common assumption, what has been called "the conduit metaphor" (Reddy, 1979), stems from the first assumption and supports it. It is the assumption that communicating or informing is the act of "transmitting" these ideational elements through language or some other communicational or informational "medium." From these two beliefs, various others follow: in information science the notion that documents are represented mental content; that thought involves the "internal" "processing" of ideational elements (classic cognitive science); that human activities, including thought, are (as in the information processing model) built up or broken down complex activities, and that learning involves building complex ideas out of simple ideas or the reverse; and that memory is, essentially, the recalling of ideational elements.

In the space of this article it is not possible to show the problems with all these beliefs. The primary purpose of this chapter is to reposition the problem of Knowledge Management, as well as information science, away from these popular beliefs (and their basis in philosophical metaphysics) and toward research in psychological development and learning theory based on social and cultural analyses. The importance of this latter set of concerns is that they are concerned with mental events as expressions that are socially situated and culturally afforded. The secondary purpose of this paper is to propose alternative models for describing mind and language, and in this, knowledge and information. The now classic cognitive models offered in Belkin (e.g. 1977, 1990) and Brookes (1980) in information science (i.e., information science's "cognitive turn" (see also Ingwersen and Järvelin, 2005)), which directly or indirectly have influenced Knowledge Management, are filled with erroneous metaphysical conceits and folk-psychology (in the field of information science, Frohmann (1992, 2004), has acutely pointed many of these out). They are based on an appropriation of Western folk-psychology and they carry with them the metaphysical conceits which have permeated, and to some extent, still permeate, cognitive psychology. Since the problems that face us are conceptual, empirical, quantitative studies, which by their very nature start from established assumptions about what is being studied, are not very useful. Our work must be that of conceptual critique. The issues that confront us are difficult because of the assumptions we hold. Mental events are cognitively simple, but culturally complex. What I would like to offer in this article is a very simple explanation of mental events, but one that may help some to see through erroneous assumptions.

In this article I would like to present a theory of knowledge (and with this, mind) that is based on Rom Harré's discursive psychology,, influenced by the philosophy of psychology and language of Ludwig Wittgenstein and the developmental psychology of Lev Vygotsky. From this, pace the important work of the psychologists, Arthur M. Glenberg and David A. Robertson (Glenberg, 1997; Glenberg and Robertson, 1999 and 2000) in regard to their "indexical hypothesis," I will then outline my own understanding of a theory of

"indexicality" as the basis for psychological being and for psychological and social development and for epistemological "structures"—such as concepts and categories.[2] This latter is meant to replace theories of quasi-physiological, private or public forms that are sometimes suggested by terms such as "mental models," "categories," "ideas," "concepts," etc. The attempt is to replace the "structural"-"spatial" senses of such terms and others (e.g., "frames") and the container metaphors ("Chinese box"-like) that follow, with instead, temporal and developmental senses and research following these last. I would like to stress the temporal, discursive, and ultimately culturally and socially pragmatic and dialogical nature of mental events and psychological development.

All beings, including human beings, must have their being and identity accounted for in terms of their historical development and their social construction. While this seems obvious, much of the metaphysics of humanism has been devoted to bracketing this imperative in order to see humans as ontologically distinct from other animals, in particular, and other beings in general. The uniqueness of human individuals, however, is not due to any a priori qualities in themselves or in their humanness, but like all other animals and all other living beings in general, is due to their social, cultural, and historical specificity of development.

While human beings become the persons that they are only because they are social, cultural, and historical, such persons are unique. In contrast to our habits in English, we should say that persons are "singular" rather than being, a priori, "individual," since the former gives an historical and social perspective and the latter tends, traditionally, to view persons as somehow self-constituted from birth (while this may be true physically, it isn't true psychologically).The primary error of Knowledge Management, like

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[2] My own path to an "indexical" theory of meaning construction and psychology was through simultaneous studies in various areas: the psychological critiques and theories of discursive psychology in Rom Harré's works (influenced by the work of Wittgenstein and Vygotsky), the critiques of psychology by Wittgenstein, the theory of indexicality (*indice*) in the work of the French documentalist Suzanne Briet (Briet, 2006), and my own work on the problems of models of mind and language in information science and, then, Knowledge Management. These came together during a keynote talk that I gave at the Australian Conference for Knowledge Management & Intelligent Decision Support, conference in Melbourne, Australia in November, 2004. I encountered citations to Glenberg and Glenberg and Robertson's articles in editing Stephen Gourlay's paper for this current volume. Since Glenberg and Robertson's work speaks for itself, I will leave it to the reader to more carefully separate out the differences between their works and my present paper, other than to say that my sense of "embodiment" is possibly less literally physical and more cultural than theirs. In any case, I urge readers who wish a more complete understanding of an indexical theory of personal psychology and the construction of meaning to read their works.

information science, is to think of persons and their knowledge in terms of "individual" or "private" minds, mental "contents" in such, and so-called "public" expressions of such contents in various public "mediums."

I would propose (again, after Harré (1984, 1989), that persons *develop* various types of *personal* potentials for using cultural tools, and that these potentials, when performed in either relatively solitary or social situations, then are traditionally seen as reflecting various types of mental "states" ("knowledge," "feelings," "beliefs," etc.) and their contents. The popular conception that performances reflect mental states and contents is, however, wrong: such "states" are cultural categories—not actual mental "faculties" or other mental "structures." And the performances are situational actions of what could potentially be performed or not (the performances give assurance of potential). Potential mental events are always hypothetically derived; they don't refer back to objective entities and certain causal powers.

There are several important points to note here. Each of these points, below, outlines an alternative approach to traditional manners of understanding "knowledge," "information," "feelings," "beliefs," etc., as these are traditionally understood as psychological faculties and entities.

1) Actions, related to verbal expressions ("knowing," "feeling," "believing") precede nominals ("knowledge, "feelings" (i.e., affective states), "beliefs"), and they are the only real existents (though, they are "real" only in the sense of being culturally understood events or actions). The supposed nominal mental "states" are only reifications of the actions and the verbal descriptions of such.

2) Potentials for "expressions" are ascertained, ultimately, by the performances themselves, which are context and time specific. (Different situations and times of testing may yield different results.) Further, claims of the "content" of mental "states" (e.g., "knowledge") are, in reality, judgments as to the types and qualities of actions performed in specific situations, with the judgments following cultural categories and socially produced expectations.

3) "Private" knowledge, feelings, beliefs, etc., are impossible, but "public" knowledge, feelings, beliefs, are, a priori, certain. We are born into and we grow up in language, as well as in other types of cultural affordances for meaningful actions. The public nature of our meaningful actions (including actions whose meaning is to be "not meaningful") is a given. However, we are born into specific cultural and social situations, we are born at certain historical times, we have very singular relationships with other people and with the world as a whole, and all of this leads to a specificity or "singularity" in our development and in our responses to the world. We may say that, in a sense, we are born many, but we grow into a singular being—and in this sense, we become an "individual" person—a, literally, personalized sense of the many persons and experiences that we have encountered. To summarize: "private knowledge" is not the

opposite of "public knowledge." The former is impossible[3] because we are historical, cultural, and socially situated beings, from the moment of birth (and possibly even from the time in the womb) until the moment that each of us dies. However, because we are singular beings, in so far as we learn, remember, and, as humans particularly, we reflect upon the persons that we are (again, however, using cultural forms for our expressions and social criteria for our judgments, as well as for constructing our memories of our past and future selves), we build unique or "personal" manners of performing. Persons and both their very "common" and their very unique or "personal" styles, abilities, and potentials become increasingly important in defining the physical individual as a psychologically singular person throughout a person's life. One is only marginally born a psychological person, though one is certainly born a physical individual. By the time we are old we are sometimes more "singular" than we might wish! "Person" is a psychological category tied to a physical individual, but they are not the same. One develops personhood throughout one's life by one's being in the world.

4) Because much of our primary modes for assembling our persons are learned in childhood, "primary indexes" for the persons that we are and will become are developed quite early and increasingly, intricately, built upon (language acquisition and development is an example of this). Later, I will discuss the construction of personhood through the establishment and development of "personal indexes" for experiencing and acting in the world. Persons also develop long-term "personal indexes" with other persons, which lead to feelings of near-death bereavement when those other persons die (a sense of self larger than that tied to our individual bodies). And for good reason, since with the death of a close other the co-index in which a sense of our life has been built is gone, and with it, a type of personhood we live within is destroyed.

5) Primary indexes and their extended networks are referential, not simply to other signs, and thus to the world at large, but they reflect the agent's own history, social situation, and cultural inscription. As such, they constitute basic forms for the acquisition of experience and for learning, and they show continuity. Humans, unlike machines, largely learn by analogy and by analogical extensions between indexical networks (Day, 2005). (Glenberg (1997) and Glenberg and Robertson (1999; 2000) have referred to the mode of this extension as "meshing," and this term seems to me to well express both the overlapping and the extension of indexical networks.) We learn tasks by being shown how to do them; we learn about new

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[3] That is, "private knowledge" in the sense that meaning occurs outside of the cultural and social givens of language (for example, "ideas" as mental contents prior to their expressions in various mediums, etc.). Of course, "private knowledge," in the sense of statements, etc., that we do not want to share with other people, happens all the time.

experiences by comparison to old ways of doing and representing things. We break new tasks into simpler units for reason of having smaller units in order to analogize from. This is very different from inorganic machine "learning" which works with symbol manipulation. Machines do not experience the world as a human or even as other living beings, and their "memory" is that of data retrieval—it is not an organic memory of embedded ways of experiencing and doing things. While machines may be designed to mimic organic life, and they may do so well or not, they learn and develop differently.

6) Harré (1984, 1989) and Harré and Tissaw (2005) stress the importance of cultural "affordances" in composing, mediating, and enacting personal powers and potentials. Inorganic natural bodies express themselves in the ways or dispositions by which they are chemically or biologically encoded. However, living animals, and particularly humans, learn to express themselves by ways not just mediated by their bodies, but by social situations and by cultural forms (this is what Wittgenstein meant by a "grammar"—"grammar" refers to the cultural forms and the social situations which afford and allow expressions of personal, as well as other types of agency, powers).

Ludwig Wittgenstein in his later work (particularly, part II of the *Philosophical Investigations* and his notes on psychology toward the end of his life) and the work of Lev Vygotsky, and more recently, the work of Rom Harré in "discursive psychology," are cornerstone works for treating such issues, and they allow us a more complete and theoretically elegant solution to many of the foundational problems in cognitive psychology and its offshoots (user studies in information science, for example). As is well known, the basic concept of Wittgenstein's *Philosophical Investigations* is that of the notion of "language games," but this term has sometimes been too simplistically understood. There is sometimes a tendency to believe that what Wittgenstein was arguing in his notion of language games is simply that we use different language practices in different social contexts. And while this reading is true at a gross level, it misses the importance and originality of Wittgenstein's insights on language and on the philosophy of mind and the direction that his work can give to a revised notion of psychology and psychological investigations.

What are most important in Wittgenstein's notion of "language games" are two elements. The first is that language practices occur together with other types of meaningful practices and materials. This is what Wittgenstein means when he writes of language games belonging to and constituting "forms of life." A form of life is not just a game of language, but it is an assemblage of various types of semantic objects, tools, and meaningful events. The second, related, point in Wittgenstein's notion of "language games" is that language is one tool (a variety of tools, really) among other kinds of tools for doing things in the world. There are not mental elements ("ideas") prior to these tools, and, in fact, what we call "ideas" are more or less personal or shared assemblages,

constellations, or clusters of language elements and actions and other types of material elements and actions, understood as a conceptual unity.

One of Wittgenstein's favorite examples of a game is chess. The point of the example of chess is to show that we can do various things with chess pieces: we can throw them at one another (e.g., a 'game' of "fighting") or we can move the pieces like checkers or we can use them in manners that are recognized by custom to constitute playing "chess." (Though it is entirely possible to play chess without all the officially sanctioned rules—for example, beginners often do not know the special move known as "en passant," and yet when they play they, and we, may say that they are "playing chess."). The game of chess is not a performance of a set of rules, but rather, the rules are an idealized collection of sets of moves and possible moves by recognized elements—chess pieces—that then can be reinvested into the play when necessary. The term "game" in Wittgenstein's work refers to family resemblances of elements and actions and their understood expressions, intentions, affects, and effects. The boundaries and meanings for a cultural "game" are determined by the actual series of actions or "moves" performed over and over again. These become customary, and from these, we gain the affordances and powers of actors and actions embedded in recognized cultural and social practices. There are public and private language games, but they all originate in a "public" space, in so far as they are cultural and social in origin.

Such ideas as the above have profound implications not only for offering an alternative to cognitive models based on symbol manipulation and information processing, but more fundamentally, for rethinking what we mean by common psychological terms such as "self," "understanding," "expression," "communication," "knowledge," and so on.

"Selves," as Harré has shown (1984, 1989, Harré and Tissaw) are potentialities for action, built upon past performances and abilities and intentions toward future performances. "Knowledge," in the psychological sense (rather than a documentary sense, where it refers to collections of documents, data, or even statements) is a hypothetical property of the self (that is, it only truly exists in being demonstrated), referring to past and potential future performances of an agent which are culturally regarded as knowing acts, that is, performances of "knowledge." Personal "beliefs" are, likewise, hypothetical properties of the self in regard to actions or statements about possible affairs—sometimes affairs which have no possibility for objective verification (religious beliefs, for example). The psychological study of different cognitive "states" is not a study about different possible mental states or faculties and their "contents," but, rather, it is a study of cultural grammars and groupings of what are considered to be mental events (i.e., materials and actions understood as "belief," "knowledge," "reason," "imagination," etc.).

Just as is the case with analogies of remembering (along lines of information storage and recall ("memory")), the analogy of psychological states with collections of documents is misleading. Experiences are not

collected and stored like documents, and personal knowledge is not a collection of statements, expressions, or actions that are stored and retrieved. As organic beings we are situationally embedded and culturally formed, and we developmentally acquire and extend the learned activities that come to constitute our being in the world. This, not computation and information retrieval, is the basis for our mental and our physical acts. We act based on similarities with past experiences according to our customs and habits. In most cases of memory and knowledge, we are not recalling anything, but rather, we are reenacting past actions within similar situations and cultural affordances. We are misled if we believe that memory or other mental events function like information retrieval. Instead, mental "states" are *hypothetical* collections of potentials, made real and actual only through meaningful situations. Mental states have no real existence (the term "state" misleads us)—they are what we hypothesize as potentials for certain types of performances by certain actors in certain situations.

Since "selves" are perceived unities of potential performances, and since "knowledge" is the potential performance of acts that are understood to exhibit knowledge (knowing acts) within a given cultural context and social situation, then any attempt to arrive at absolute amounts or values of knowledge or "intelligence" is based on erroneous assumptions about what constitutes mental events. Often, these assumptions are based on metaphors that describe minds as physical repositories for various "epistemic content" (Frohmann, 2004) such as "knowledge," "ideas," "beliefs," or even "feelings," and it is this notion of a present, but hidden, "content" which then is assumed as the basis for objective measurement. Speculation on psychological powers lie not in the supposition of hidden quasi-physical entities, but rather, such speculation rests on hypothetical conjectures as to future performances based on observed phenomena and reputation.

Mental acts are not computational. They are not based on the "inner" mental computation or processing of discrete mental elements or "symbols." There is no picture in one's "mind" of how to use a hammer when one uses a hammer, and there are no independent modules in using a hammer that one must mentally piece together in order to use a hammer. Likewise, words don't first appear to my mind in order for me to speak, nor are there any instructions in my mind that I need to consult or any computations needed in order that I speak a sentence in my native language. Mental events—for example, knowledge events (whether verbal or tactile (e.g., hammering with a hammer))—are not information processing events. Machine "learning" is analytic; human, and probably all organic learning, however, is analogical and experiential, even if it contains analytical moments within it (these, too, must be learned situationally and analogically).

Orthodox Knowledge Management theory, following traditional cognitive theories of mind, claim that knowledge is made up of personal or private cognitive elements ("knowledge") that are stored in quasi-physiological entities called "minds" and that this knowledge can be managed via

representing, organizing, and processing it. These are errors due to thinking that mental events refer back to mental ("epistemic") content which we "have" in the same manner which we have empirical objects. Our linguistic grammar, here, misleads us into erroneous models of mind, knowledge, and language. When we speak of "having knowledge," of "having beliefs," etc., we are mislead if we think that we "have" such in the sense that we "have" a car, a kidney, or other empirical objects. When we say that we "give" someone knowledge or that we "share" it, we are misled if we think along lines of giving or sharing an empirical object. When we think of communication and information in terms of "transmitting" knowledge, we are making using of the conduit metaphor in our common folk-psychology,, and elevating a metaphor to being a theoretical model. We cannot loan knowledge, like we can loan a car. We cannot lose knowledge like we can lose a car or "lose" a kidney. We cannot share knowledge like we share a car. Knowledge is an event or the hypothetical potential for such an event, not an object. We do not "transmit" ideas, because ideas are not entities and minds are not transmitting and receiving devices for ideas. "Minds" are mental events or the potential for mental events; ideas are assemblages of signs, objects, and actions leading to events, or they are such derived from events. Our ordinary grammar misleads us, and if we fall victim to this, then we are not discussing reality or doing research, but rather, we are repeating and reifying privileged tropes in our language and culture about knowledge, psychology, and communication, and building castles in the sky based on this.

The "cure" for these mysticisms is that of viewing mental events as cultural and social events, among them, and perhaps foremost, as events taking place through linguistic forms. For Harré, this is done by viewing psychological events as discursive activities, studied ethnographically and developmentally. In Knowledge Management research, as a part of a more general knowledge studies, the project would be that of studying how people learn to do, and how they do, knowledgeable acts.

2 Indexical Psychology

Rather than a notion of "inner" epistemic contents and the processing of such contents, a better understanding of how we acquire and use language and other semantic materials and how we form minds and persons may be had by thinking of the formation of persons and mental events in terms of personal developmentally learned indexes of agent's actions in relation to the world, from which we derive meaning, intention, and identity. Such indexes are acquired at different rates throughout life, more primary indexes forming the skeleton for later indexes of understanding actions and events. Such a view stresses the extreme importance of early psychological development, but without stating that further events cannot, in some cases, modify these indexes in some ways, though such modification is difficult and even in some

cases impossible (for example, we can't unlearn our first language or learn a secondary language later on in the same way as our first language). The notion of "index" means, here, meaningful points of actions and events that indicate both the meaning and value of the actions and the events themselves and the importance and role of the person to him or herself as an agent or witness of such. We build our indexes to the world not just in regard to events in the world, but in regard to our own agencies in regard to the world. The notion of "index" points to the assemblage of references which link together experiences for each person.

We see in works such as Proust's *À la recherche du temps perdu* a catalogue or "thesaurus" of such terms, from which experience and a life and its world are assembled. The novel begins at a fictional moment in time and space, out of which memory as *recollection in experience* (via free-association or *mémoire involontaire*) unfolds for the reader. From the encounter with the *madeleine*, within the conceit of the fictional realist novel as a picture of a life, the indexes of a life are presented as analogically connected and developmentally built up lattices of elements and actions. The ability to modify the future strength— the "core"—of primary indexes (made up of elements and actions) for personal agency in life in general or for particular types of actions and intentions (and recognitions of events, as well) is in many cases limited, and so the lattices of indexical relations are developmental, not simply historical, with the core indexes being developed in early childhood or, in the case of later acquired unique skills, in the beginning process of learning such a set of skills (though these latter are, of course, also dependent upon the earlier learned, more general, core indexes).

The notion of psychological indexes turns away from distinct notions of "inner" events (such as memory and private knowledge) and outer events (such as "external" stimuli). Here, there are signs that join the person and the environment. There is no "inner" and "outer," but rather, there are simply learned, meaningful signs that allow agents to move through meaningful and potentially-meaningful environments. From this, the world and one's personal identity are established. "The inner" and "the outer" are products, not conditions, of our being in the world, and their exact natures are further established culturally, particularly through linguistic grammar (the nature of a language's first person pronoun plays a chief role in constructing the general characteristics of what a culture sees as constituting personal identity and personal agency (see Mühlhäusler and Harré, 1990)). Psychological indexes are semantic assemblages of meaningful elements and linked actions, used as tools for recognizing the world and enacting agency within it.

It is truly remarkable to consider that in infancy and childhood, especially, very simple acts, objects, and relationships are learned which are then analogically extended throughout a person's life, building complex lattices that constitute world and being for a person. For example, the mother again and again responds to the infant reaching out, and from this she constitutes herself as a primary object and a relation to the infant who

begins to see him or herself as an agent. From such simple actions a developmentally strong, but also in a sense, a rather ontologically fragile, life is built. Other relations are gradually added: for example, the father, the friends, toys, food, etc.[4] There are also general and then more specific core indexes that are developed by general acquisition and, later, specific differentiation (the mother and the father understood as guardians and then, later, differentiated according to cultural gender identities; primary multi-language acquisition, later separating out into distinct languages, etc). From specific relationships or "grammars" generalized relationships or grammars are built and then trimmed back upon (infants over-generalize verb forms, later correcting for irregular verb forms and other language-specific or cultural peculiarities). From the most primitive "conversations" of childhood with our parents or guardians we begin to set up relations to the world, and through these we then construct the networks which define ourselves as persons. Our infantile and childhood relational and linguistic indexes are very "core" in our lives, because they form the most basic objects, relations, and tools from which experience and identity are established throughout our lives.

With the actions of our parents and trusted others in our world, with the objects, images, words, and recognized touch and smells of our meaningful experiences, we form linguistic and other "grammars" for understanding the world and we become the person that we are and continue to become. Through the cultural and social worlds in which we live, we develop shared "forms of life" (Wittgenstein) which make us understandable to others and not understandable to still others.

Each person develops in a unique way, acquires a certain psychological, as well as a physical form, is a unique, or "personal," accumulation or index of elements and relations, which is singular at any place and time and is singular as a life. But, we are singular because of the multitude of historical relations and cultural forms which allow us to become singularities. And, we are, in a sense, multiple, because the singular is made up, in its past and in its future, of a multitude of past and possible relations and expressive forms. Our personal being is built out of social and cultural being in time, but personal being is real, though its totality is hypothetical (whereas abstract entities, such as "society" and "language," are abstractions in their totality and real only in their particular occurrences).

"Ideas" or "concepts" are assemblages of signs, objects, and actions leading to events, or they are such derived from events. They are meaningful assemblages which other people might understand as interesting and useful for doing things with, sometimes leading others to respond with more such

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[4] The father could be first, of course, before the mother, or there could be two mothers, or "substitute parents," etc.—the point that I am illustrating here is that of developmental networks; it is not my intention to privilege classic Oedipal structures and particular cultural norms, etc.

ideational clusters or responding with largely physical actions. "Ideas" or "concepts" are not spatial or quasi-empirical "structures" or grand mental "images." We "understand" another's ideas because we are able to do things with these assemblages that may, potentially, be more or less commonly desired within a shared grammar or form of life.

I correctly understand that a small piece of furniture is a table because when you say, "put the glass on the table," and then I do what I think your words are directing me to do, you don't protest that what I put the glass on is not a table (saying, for example, "no, that's a stool—the table is up here. It is much lower than the stool. Now, put the glass on the table and not the stool"). As Wittgenstein pointed out, there is no idea of "table" in my mind when you utter the sentence and I respond, no more so than I must have a "picture" of a hammer or the "mental model" of hammering a nail with a hammer in my mind in order to find a hammer and to hammer a nail. Mental events—in the largest sense of the term—are composed of many elements: words, physical actions, and in dreams, a high level of visual materials, making up narrative "pictures." The notion that an "idea" is a picture, though, leads us to a picture theory of mental events and to understanding communication and information as ideational transmissions. But, the plumber doesn't have a visual picture of tightening a joint in his head or in his fingers when he or she has an "idea" of such. When communicating the idea of tightening a joint, the plumber may describe this process to another person, may demonstrate it, or may even draw a representation of such. Each of these actions is tied to situational indexes for performing these actions, and doing so successfully. Each of these actions are "pictures" only in so far as the word "picture" might be understood as synonymous with that of a successful performance or the successful teaching of a performance.

Ideas and concepts are not private, simple or complex, "inner" mental entities, but rather, they are signifying clusters that have a certain meaningful unity.

If I try and think of whether I've ever had an idea—for example, the idea of an idea—an icon of a "light-bulb" may come to my mind, following the cartoons and advertisements with which I grew up. Here, in thinking of "idea" I come to think of a certain type of picture of a light bulb—one sign indexically refers to another. One views with this example that signifiers refer to other signifiers in pragmatic relation to one another in regard to activities in shared forms of life (a conclusion that meshes with Wittgenstein's theory of meaning as use, with French poststructuralism, and with the American pragmatists' ideas on association). "Ideas" and other terms for "signifieds" are, thus, products of discourse, dialog, and other ways of doing things with meaningful materials.

The importance of core indexes and the indexical nature of our being in the world are demonstrated by how we learn a second language. In learning a second language we are presented with the problem of having to pass through the first language that we have learned—the first grammar or form of life. Learning several languages together in childhood is a much easier way to learn

several languages, because we gather groups of signifiers that are then, later on, "fleshed out" in terms of other recognized signs, objects, and situations. The "core" which we build is that of events which are multiply linguistically signified. But, older second language learners must first, and perhaps always, have to deal with having to translate the new materials and relations which form the "world" of the second language through the core index of the first. Eventually, one becomes more or less fluent in a second language (one is able to do things with the second language without having to translate it through the first language all the time), but the first language always retains a privileged cultural relation to the world for the speaker which cannot be forgotten, though it may now be challenged by the second language and its affordances.

3 Memory

The theory of mind that I have been proposing is that of understanding "mind" to be a hypothetical toolkit[5] of assemblages of meaningful materials and actions whose epistemic qualities ("knowledge," "belief," etc.) and value are determined by performances (though there are also institutional accreditation processes, reputations, etc. that make claims as to the "content" and value of a person's "mind" or "mental faculties" as well, though these are likely also tied to reputations of past performances and to hopes or assurances of future performances). "Mind" refers to capacities for performances of "mental" acts, and the notion of "mental performances," as well as the so-called "faculties" of the mind, are judgments made of performances according to cultural grammars and their categories (i.e., cultural criteria for what are considered to be "mental" performances, for what are determined to be "knowledge" or "belief" performances, etc.).

The embeddedness of cognitive materials in situational use has been commented on in the past by others. We have already mentioned the well-known example of Marcel Proust's large novel, *À la recherche du temps perdu*, where the famous small cake, the *madeleine*, leads to an extensive story of indexically linked experiences that come to constitute, in their totality, the life of the narrator. Proust called the form of cognitive recollection which is demonstrated in the novel, "involontaire." It is involuntary memory because of the indexical relations that each semantic assemblage has to one another—the meaning of each assemblage is connected to many others, so that beginning at one point one extends out into a network or lattice of meaningful relationships. The structure of the novel proposes that by examining any one assemblage a multitude of indexical and recursive relationships unfold back into the past, and by implication, also come to structure the future. The "earliest" memories

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[5] The metaphor of "toolkit" comes from Wittgenstein's later work, and others in information science have used it, such as Blair (2006).

are important, not because they are "earlier" (which is difficult to objectively determine—they may or may not be empirically true), but because they are core to a network of dynamic relationships. In this way, Proust's novel reaches beyond the traditional literary form of the novel and its rhetorical devices and mirrors psychological reality, thus giving a deeper meaning to the genre concept of "psychological realism" within which Proust's work is a landmark text within. The strength and the fragility of the novel is that of an extensive network of relations that give the whole meaning, but is built around a likely, but still hard to be certain of, fiction (—the rhetorical form of that paradoxical, modern literary canon, "realist literature"). This mirrors the ontology of personal human lives. The "fictional realism" of the novel precisely characterizes the fragile, but only possible, ontological nature of each our own lives.

To realize that our histories and, thus, our personal and social beings are both this strong and this fragile is a stunning, and perhaps disturbing, thought. It can feel, at first, like we have kicked out the ladder upon which we believe we stand. We appear to be like a spider, suspended on an incredibly strong, but in some ways, surprisingly fragile, web of cultural signs and social recognitions. The strength comes from our relations with others—from our being born and subsisting in culture and society—, but the feeling of fragility comes from the non-empirical character of the psychological histories which constitute our being. All that we are is due to signs, relations, and actions which not only describe, but also constitute, our understanding.

For example, let us say that we remember "winter" as a certain assemblage or cluster of linguistic and visual signs, images, physical objects, and emotional feelings. I look in a book that was popular in my childhood, though not necessarily of a series that I owned or remember owning. Let us say that it is one of the books in the *Lassie* series, which was popular in the United States in the 1960s. Even though I may not have been a reader of *Lassie*, in its drawings I now recognize the snow, the cardinal, and the trees. I recognize the figure of the trusted ranger. I recognize the mother. If not this book, then a similar one was read by me at home or at school at a certain time when I was a child. These drawings—no, really, for me, not just *drawings*, but rather, thanks to my parents, teachers, and other guardians, these *pictures*–produce a feeling of recognition—the literal physical objects of winter, the winter birds, feelings of trust toward certain appearances and "types" of people, etc. In general, the emotional feeling of these signs is also "warm"—it is reminiscent of my childhood and it constitutes certain central indexical signs and networks that make up my core self. As an adult, while looking at the pictures of the snow and of the cardinals, I now ask myself, why isn't winter like *that* anymore? For, I recognize these as pictures of how winter was when I was a child. Is it because of climate change? Is it because I live in a different part of the globe than where I grew up? Certainly, I have grown up, but the problem is that winter doesn't even *look* like that anymore in its natural state: the snow is

different, the trees are different. *That*, I say to myself, pointing to the picture, is how winter used to be, *that* is what a cardinal looks like . . . .

And, of course, that act of pointing, and particularly, the pointing to an actual sample of a *type* (the *cardinal*) is my clue as to what is actually psychologically occurring. It is the clue that my memory of how winter was in my childhood, how winter will always be for some part of my experience, is due to this picture—not this picture, per se, but this style of showing "winter," of giving a picture of a "cardinal." These are indexes for understanding, experiencing, and acting within "winter." This is what I was being taught in learning "how to read." This is what "literacy" means. Here, "winter" was/is, for me, psychologically, a picture (an idea, in the sense of the term meaning a semantic assemblage). It is empirically based, however, on my having been taught to meaningfully see the world by means of these *drawings*. These drawings were instilled in me, by means of repetition, human trust, and instruction, to be core indexical terms for referencing a world and my place in it. By means of repetition, human trust, and instruction, as well as by their place in an entire culture of signs backed by these qualities, these *drawings* became *pictures*, and the signs became meaningful indexes for real being (that is, they became oblique to interpretation, transparent in my ability to act by or "through" them). With these drawings, these styles of depicting and naming, the empirical world on the one side of my young life and the semantic world on the other were literally *inscribed* or sewn together by the materials of lines, colors, and words, which were turned into meaning by the instruction of my mother who, as I rested secure in her arms and on her lap, approvingly taught me to *read* the world into being—namely, a cultural and social being, which I would throughout my life enact and represent, *as a way of being in the world*. Throughout a life, the ease or difficulty by which an agent moves through the world is conditioned by such readings and their fit within actual relationships and events. Drawings, *made by my mother and others into pictures through which I could see the world as meaningful and valued entities and relations*, like those found in the *Lassie* series, were important core indexes for teaching me the meaning of winter, for teaching me the meaning of snow, for teaching me to identify and attribute qualities to certain types of birds (for example, "cardinals"), and beyond this, certain types of recognized people and events.

The point of this story is that indexical assemblages of signs in certain arrangements and forms constitute—sometimes in a core manner that is nearly impossible for the person involved to see purely "objectively" or empirically—mental events.

Holding on to heirlooms or souvenirs, like maintaining long-term family and friend relationships, allows people to feel like they, literally, *have a past*. And, indeed, these are the ways that we "have a past" since we can "have" a past in no other more secure ways, though our ways of being in the world are witness to our being constituted by a past, into a future.

There is no more authentic "my past" in the same way that there is no more authentic "my ideas"—i.e., as highly privatized, originary acts. "My past,"

psychologically, and thus, experientially speaking, means relatively unique or not so unique arrangements of shared social and cultural materials and actions, including social and cultural materials and actions for doing acts of remembering "things past." Exploring (Proust's "*recherche*") things past is always a process of exploring the various indexes, not *to* the past, but literally, those indexes that constitute not only our past, but our present and our future.

4 Conclusion

In this article I have argued against mentalist models of mind and language, and in so doing, I have suggested that common epistemic and communication models in Knowledge Management theory and information science which start from notions of private mental faculties and content are erroneous. I have offered an indexical model for knowledge and other mental events, which proposes that selves and their mental "faculties" and "contents" are developmentally and indexically constructed from their experiences. Such a model views personal knowledge as experientially constructed from cultural materials and social situations. Such a view challenges the most basic premise of mentalist models, namely, that psychological discourse and research must begin with a model of subjectivity based on "external" stimuli and "internal" mental events, and instead, views the personal agent and his or her world as historically co-produced by means of agents using cultural materials in social situations. Agents moving through signs create meaningful persons and worlds. This is our manner of being in the world.

General "core" indexes and their grammars, and in these, what Wittgenstein termed core "language games," for experiencing, understanding, feeling, learning, etc., are largely formed in infancy and during childhood. Such indexes are "core" because they act as tools for creating persons and their worlds throughout life. A speaker's native language is a cultural material that greatly contributes to forming core indexes, but it is learned and applied through interaction with parents, guardians, and others.

Psychological "memory" does not refer to a region of the brain, but rather, the term refers to the activity ("remembering") of constructing a past through various indexical materials and their relationships, with or without empirical documents or living witnesses. Psychologically speaking, we do not have an empirical, objective memory of the past, since, psychologically speaking, the past exists only in the indexes which constitute it for us.

Forms of life may overlap with one another or not. Understandings (i.e., the common use and expectation of tool use (for example, signs)) between groups or types of beings may or may not be had due to differences in cultural affordances and/or social situations. "Forms of life"—persons or groups—are built up over a life time and over life times, though there may be physiological characteristics that, from birth, more afford the development of certain forms of life rather than others.

Information science in its "cognitive turn" and Knowledge Management theory have held themselves captive to deluded understandings of mind and language, dominated by a picture of quasi-physical mental structures, their contents, and their public expressions in various mediums of language. Here, for example, documentary forms are seen as public representations of private mental content ("ideas"). These delusions are founded upon misleading tropes in ordinary language and in metaphysical assumptions that, historically, reach back to Ancient philosophy and forward, through folk-psychology,, into traditional cognitive science.

The more we can do to dismantle these poor models in information science and in Knowledge Management, the more, then, that we can begin to consider the true problems at stake in regard to information and knowledge. Much of this dismantling requires conceptual critique and cultural analysis. According to this view, psychological research is the task of understanding cultural grammars and their acquisition and how these afford actions and potential actions ("powers") by agents in social situations. Psychological research should not be that of inventing quasi-physiological causes for cultural activities or for analyzing meaning formation from models of symbol manipulation or "information processing" (an error based on false analogies between machine processing and mental events). (I will suggest that these last caveats apply not only to human psychological research, but to psychological research into other animals, as well.)

Acknowledgments

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