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**Supporting Knowledge Diversity in
Knowledge Intensive Firms: A New
Frontier for Information System
Design**

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Abstract

The emerging global economy is increasingly characterized by knowledge intensive firms. These firms require that diverse, specialized knowledge workers develop unique knowledge competencies, and also collaborate in ways that enhance the performance of the organization. By highlighting the need for both the separate development of competencies as well as their combined application, knowledge intensive firms put renewed attention on the phenomena of differentiation and integration as originally theorized by Lawrence and Lorsch (1967). The Information Systems field has for too long emphasized the integration half of their insight, and has neglected the need to develop information systems to support the differentiation of knowledge and the conduct of dialogue among highly differentiated experts. This paper argues the need for information systems that actively value the diversity of differentiated knowledge and that provide mechanisms for the integration of knowledge which respects the separateness of each expertise and way of knowing.

Introduction

As we move towards the 21st Century, we are experiencing many unprecedented changes in the world of organizations and the nature of work. Intensified global competition and rapid technological and social changes require that organizations respond to a turbulent market environment with newer, better, and more innovative products and services faster than ever before (Purser and Pasmore, 1992, Lawler, 1992). Two outcomes of this increased pace of environmental change and new product development are the gradual replacement of capital and labor intensive firms by 'knowledge intensive firms' (Starbuck, 1992), and a shift of employment from routine to 'knowledge or non-routine work' (Pava, 1983).

Labeling of firms as capital intensive or labor intensive denotes the relative importance of capital and labor as production inputs. Accordingly, knowledge intensive firms denote a new species of organization where knowledge has more importance than other inputs (Starbuck, 1992). The key input in such firms is expertise, both strategic and technical, which enables the firm to outperform rivals that possess only commonplace market knowledge. This expertise is embodied as the specialized knowledge of individuals who are the major source of competitive advantage for such organizations. As Starbuck (1992) comments on one such knowledge intensive firm (Garden); 'The key labor inputs came not from the machinists in the plant, but from the engineers and managers in the office building. These people had created monopolistic opportunities for Garden over and over again. Garden was the only producer of many of its products, and the dominant producer of all of them' (pg. 715).

Examples of knowledge intensive firms are consulting organizations and high technology companies such as in the computer and communication industries and the pharmaceutical and bio-technology industries. These firms require extensive knowledge from many different domains to successfully produce their products and processes. Sometimes, more traditional firms may have 'knowledge intensive functions' such as strategic planning, which share many of the overall features of knowledge intensive firms.

These firms are primarily characterized by knowledge work as opposed to routine types of work, such as traditional manufacturing, where the steps and procedures to transform inputs to outputs are known well in advance. Routine work can be well defined, repetitive, and embedded in clear, shared goals. Building the one-thousandth car on the assembly line is not radically different from building the first car. In contrast, knowledge work such as new product development is an inherently complex, uncertain, and ambiguous process. It is typified by high task variability, uncertainty, and competing, multiple goals.

A critical feature of knowledge work is that it requires multi-disciplinary expertise in order to achieve a complex synthesis of highly specialized state-of-the-art technologies and knowledge domains (Purser, Pasmore and Tenkasi, 1992). In the process of new product development, for example, we see that the requisite knowledge is diverse, multi-faceted, multi-leveled, and highly detailed (Dougherty, 1992). For example, a typical pharmaceutical product development team is composed of members (many of them Ph.D.s) with specialization in medicine, chemistry, life sciences, biopharmaceutics and toxicology (Tenkasi and Purser, 1992). In order to maintain their expertise, each of these domain experts must separately develop their

unique understandings and knowledge base. Yet, in order for the firm to successfully develop new products, the separate domains must interact in a way that yields new insights into a problem and new ideas for improved products. The knowledge intensive firm thus requires both differentiation and integration of its multiple forms of expertise.

Information systems planning and design today recognizes the need for supporting integration, but has lost sight of the need for supporting differentiation. Valuing diversity in knowledge intensive firms is, we argue, a new frontier for the development of information systems. We will first discuss knowledge integration as a perspective taking process, and the necessity of representing diversity in knowledge as a necessary condition for perspective taking. We will then review why we believe the information systems community has failed to recognize the corollary need for supporting knowledge diversity. We will then present a discussion of ways that perspective-taking can fail in organizations, and some examples of how information systems can support both knowledge diversity (differentiation) and perspective-taking (integration). Finally, we will identify some examples of systems that are beginning to display a concern with supporting knowledge diversity and some research issues that should accompany these emerging systems.

Knowledge Integration as Perspective Taking.

In knowledge intensive firms, competitive advantage and product success are a result of collaborative, on-going learning. That is, success depends on how effectively the diverse individuals are able to organize and develop their unique knowledge competencies, as well as how effectively they can integrate and synergistically utilize their distinctive knowledge (Dougherty, 1992; Purser, Pasmore and Tenkasi, 1992; Nonaka and Johnson, 1985; Stata, 1989; Meyers, 1990; Brown, 1991).

Such collaborative, on-going learning by both the individual expert and the team is required because critically important processes such as new product development are "too complex for one person to understand in its entirety" (Brehmer, 1991; p. 4; Nersessian, 1992). It entails an emergent (Knorr-Cetina, 1981), frequently lengthy, work process which is incremental, exploratory, and often times moves in circles through multiple pathways. In these knowledge-intensive processes, procedures for task accomplishment must be developed while the work is being performed (Purser and Pasmore, 1992). The problem-solving and innovation that characterize knowledge intensive firms are epistemologically unsolveable by any one person and require continual insights from a variety of perspectives (Fleck, 1979). Duncan and Weiss (1979, p.86) summarize this process as one in which: "The overall organizational knowledge base emerges out of the process of exchange, evaluation, and integration of knowledge. Like any other organizational process, It is comprised of the interactions of individuals and not their isolated behavior." It requires a process of mutual 'perspective taking' where distinctive individual knowledge is exchanged, evaluated, and integrated with that of others in the organization (Nonaka and Johnson, 1985; Shrivastava, 1983).

Much of social behavior is predicated upon assumptions an actor makes about the knowledge, beliefs and motives of others. This is the beginning of the process of 'perspective taking,' and is fundamental to communication. In any communication, the knowing of what others know is a necessary component for coordinated action to take place (Bakhtin, 1981; Clark, 1985; Krauss & Fussell, 1991). As Brown (1981) observed, effective communicating requires that the point of view of the other be realistically imagined. Others such as Rommetevit have affirmed this point: "An essential component of communicative competence in a pluralistic social world...is our capacity to adopt the perspectives of different others" (Rommetevit, 1980, p. 126). The fundamental importance of taking the other's point of view into account is seen in Mead (1934) who referred to it as taking the attitude of the other and equated our ability to be fully human with our ability to maintain an inner conversation with a generalized other.

In order for perspective taking to proceed, the diverse knowledge held by individuals in the organization must be represented in its uniqueness, and made available for others to incorporate in a perspective-taking process. Valuing diversity of knowledge by enabling each type of expert to make unique representations of their understandings, and assisting actors with different expertise to better recognize and accept the different ways of knowing of others, is the foundation for perspective taking. It can be provided by information systems that include an emphasis on supporting differentiation.

Perspective Taking as the Integration of Differentiated Knowledge

The process of perspective taking in knowledge intensive firms is essentially the process of integrating the firm's differentiated knowledge structures. The importance of differentiation and integration in determining the adaptability and success of organizations was formalized over two decades ago by Lawrence and Lorsch in their classic Organization and Environment (1967). They observed that the particularities of the environment, task and technologies faced by an organization's sub units were associated with differences in the cognitive and emotional orientations among managers in those units, and with differences in the departments' formal structures. The more differentiated these sub units became, the greater the need for methods of integration to achieve a collaborative outcome.

Their message was simple and persuasive: the greater the uncertainty in the environment, the greater the need for diversity in sub unit knowledge and operations, and the greater the need for mechanisms of integration. The mechanisms proposed by Lawrence and Lorsch were structural ones (liaisons, project teams, etc.) and were devices for enriching the interdepartmental communication of the organization. Galbraith (1977) popularized this view of organization design as information processing capacity, and the introductory textbooks of the information systems community have adopted this imagery as a basic tenet of information systems design. (Alter, 1992; Laudon & Laudon, 1991; Senn, 1990).

We argue that in the process of making Lawrence and Lorsch a kind of organizational paradigm for guiding information system design, the emphasis has somehow shrunk to focus on only the integration half of their original formulation of the differentiation-integration relationship. Just as the structural elements of liaison, teams, and matrices were seen as enabling integrative information processing for the overly differentiated organization, the information systems

community has to this day seen its technologies as primarily, if not exclusively, integrative. Starting with early images of the integrated firm-wide system (Blumenthal 1969) and of the corporate model as a basis for defining decision requirements and information needs in system design (Ackoff, 1967), information technology has consistently been portrayed and planned for as an integrative mechanism. Today, information technology is seen as a primary vehicle for articulating and disseminating the integrative strategic themes that will insure a firm's success.

This integrative image is reinforced by recent research in corporate strategy emphasizing the importance of shared interpretive schemes (Bartunek 1984; Ranson, Hinings, & Greenwood, 1980), common visions (Collins & Porras, 1991; Elms & Wynkoop, 1990, Bennis & Nanus, 1985; Adams, 1986) or shared strategic image (Hamel & Prahalad, 1991; Bertado, 1990). They are an important part of the larger intellectual environment reinforcing the felt need for an integrative role for information systems. This emphasis on the shared and the common at the organization level is matched at the hardware level. The current proliferation of computing equipment manufacturers and nagging problems of connectivity put a dramatic and urgent emphasis on the need for integrating the differentiated components of systems.

Within this overall climate stressing the need for integration, ranging from organization strategy to computer hardware, it is not surprising to see the current concerns of the information systems community dominated by themes of sharing and commonalty. Whether we look at the level of data, models or decision support we see the same overarching concern with integration and little or no attention paid to the need for differentiation and its support. Enterprise modeling and data architecture are centrally concerned with defining a single, unified data structure for supporting an integrated system (Scheer, 1992; Deng & Chaudhry, 1992, Targowski, 1988; Richardson, Jackson & Dickson, 1990, Chen, 1976). In the group support area, the emphasis is almost exclusively on gaining group consensus (Tyran, Dennis, Vogel and Nunamaker, 1992) or reducing conflict (Sambamurthy and Poole, 1992). Similarly, model management systems concern themselves with unifying the diversity of knowledge in management decision models through a variety of meta-level integrative techniques (Geoffrion 1987; Dolk 1988; Elam and Konsynski, 1987). Executive support systems are clearly an area in which the valuing of diversity is possible (Watson, Rainer and Koh, 1991), but there have not been any convincing examples of diversity or differentiation enhancing executive support systems based, for instance, on dialectic inquiry (Churchman, 1971).

End-user computing seems to be the most prominent activity in which the diversity of knowledge and understandings in the firm is respected by information systems. But one would hardly call this an active relationship with respect to supporting the diversity of knowledge and ways of knowing. The tools for end users are essentially the same tools used by the systems developer, and the question of how different expertise and forms of knowledge are best represented and communicated is never raised. Further, it seems a principal concern with end-user computing is the reduction of diversity and the establishment of standards and common structures for data and models (Brown & Bostrom 1989; Munro, Huff & Moore, 1987; Rivard & Huff, 1988).

The Corporation of the 1990's: Information Technology and Organizational Transformation is a recent well-publicized effort to define the future possibilities for information systems to "... influence organizations and their ability to survive and prosper in this decade and beyond" (Scott

Morton, 1991, from the overleaf). There we see the same emphasis on the need for information systems to provide integration. Surprisingly, the report pays very little attention to knowledge and knowledge-intensive firms, but when it does, it plays out just the scenario we described above. Rockart and Short (1991), for example, make explicit use of Galbraith as a basis for identifying integrative mechanisms, and highlight the need for systems that create "shared goals; shared expertise; shared work; (and) shared decision making" (figure 7-5, p.201). When they do give examples of integration, it is an image of operational integration as in the value-chain model (p.206) without attention to how knowledge integration might take place. In that same volume, Venkataraman (1991) discusses in passing that information systems should create networks of "shared knowledge" or a "virtual intellectual network," but the only suggestion made for an application that might support these "soft processes" is e-mail.

Talk about integrating knowledge stays at this distressingly vague level, we suggest, because of the lack of attention to supporting diversity in knowledge among firm members. With an emphasis on integrating operations and defining shared data and models, the unique elements of knowledge so vital to a firm's success are almost by definition outside of the information system community's concerns. Without attention to building systems that support diversity and uniqueness among knowledge workers, the information systems community has no vocabulary or imagery for discussing what it is to integrate different knowledge and expertise.

The one area in information systems where a concern with diversity and differentiation is evident is in the recognition of the importance of involving different stakeholders in the system development process (Checkland, 1981). But even here, we would argue, the emphasis is on collecting the different values and perspectives of the various stakeholders so that a system design can better reflect the full range of expectations and demands that may be made upon it. We don't, for instance, see the design of systems that help different stakeholders to develop, maintain and enhance their distinctive knowledge structures in a unique and powerful way. We don't see a design for systems that would help to increase the diversity and differentiation among the "cognitive and emotional orientations" of managers in various subunits.

With the emergence of knowledge intensive firms, we submit, the overemphasis on integration in information systems becomes highlighted. Knowledge intensive firms require an attention to the nurturing of specialist expertise as well as an attention to integrating their diverse ways of knowing. In fact, we argue, only if we attend to developing systems that support and enhance the differentiation of knowledge diversity will we be able to think clearly about what it means to integrate knowledge.

If we look back to our community's early roots in cybernetics (Wiener 1961; Ashby, 1960) we see the importance of the notion of requisite variety in our initial conceptualization of information systems (Beer, 1967). An emphasis on integration is acceptable when the diversity of knowledge is sufficient and established, and when the problem of organization control is one of unifying across the diversity to achieve coordinated action. In the age of knowledge intensive firms which we seem to be approaching, however, a more balanced emphasis on both the differentiation of greater varieties of expertise and their integration into collaborative knowledge intensive networks becomes the central challenge for information systems. Both differentiated knowledge

capabilities and collaborative mechanisms are in need of invention, development and enhancement in knowledge intensive firms.

Break Downs in Perspective Taking

The task of taking each other's knowledge and background into account is fundamental for successful coordinated action among actors with diverse knowledge and expertise. It is a complex process, and can frequently break down. For example, Purser et. al (1992) did a comparative study of two knowledge intensive product development projects of equal technical complexity in a high-technology firm. One project succeeded while the other failed. Two essential factors accounted for the differences in results between the two projects. The first was a higher incidence of barriers to knowledge sharing among the members on the failed project team. But behind this first factor was a second, causal factor of failed perspective taking. Team members were unable to surface and reconcile dissimilarities in their knowledge and cognitive frames of reference. Failure to achieve perspective taking through depicting and exchanging representations of their unique understandings, dramatically reduced their possibilities for successful team knowledge work.

In order to understand break downs in 'perspective taking' a discussion of the process of perspective taking is in order. Perspective taking involves a variety of inferential and judgmental processes. Individuals may utilize an assortment of knowledge structures, such as schemata, interpretive schemes, stereotypes, and inference heuristics to estimate what others know. Such structures can facilitate the task of drawing inferences, but they can also induce systematic errors and biases (Kahnemann, Slovic, and Tversky, 1982; Nisbett & Ross, 1980). For example, an actor may use the availability heuristic to assess what others know. The ready availability of the actor's own perspective may lead the actor to overestimate the likelihood that the perspective will be shared by others. This false consensus effect, in which subjects assume that others are more similar to themselves than is actually the case (Ross, Greene & House, 1977) is a form of bias particularly relevant to the perspective taking process. Steedman and Johnson-Laird (1980) have proposed that "the speaker assumes that the hearer knows everything that the speaker knows about the world and about the conversation, unless there is some evidence to the contrary" (p. 129). This heuristic should lead to overestimates of the extent to which a speaker's knowledge is shared by others, and studies support the existence of such a bias (Dougherty, 1992; Krauss & Fussell, 1991).

According to Starbuck (1992) this a common problem with experts in knowledge intensive firms. Expertise implies specializing and moving into distinct occupational niches. This reduces versatility and limits flexibility, and niches can often become evolutionary dead-ends in terms of being open to learning outside one's expert domain (Beyer,1981). Since expertise entails perceptual filters, experts may be gaining knowledge within their specialties, but they are often closed to important and relevant events outside their limited province (Starbuck, 1992).

Dougherty (1992) provides an insightful analysis of break downs in the perspective taking process due to actors' inability to surface and examine their differing interpretive schemes. In her pioneering study of new product development efforts across multiple firms, she examines and establishes how differing interpretive schemes of the various players involved in product development can be a major barrier to the linking and collaboration essential to successful product

innovation. Data regarding 18 new product efforts which incorporated new or unfamiliar technology in five firms were collected by interviewing 80 people from different departments who worked on these products. Two of the firms were in computer/communication industries and three were in chemical industries. Some products were commercially successful, and some were failures. The principal research question guiding the study was: why do innovators fail to develop a comprehensive appreciation and understanding of the product? Her findings suggest that, uniformly in all the unsuccessful cases, the key players interpreted and understood issues around technology-market linking and new products in qualitatively different ways from each other and were not able to reconcile these differences.

The differences in interpretation centered around three themes. The first theme was what people see when they look into the future, including which issues are seen as most uncertain. Each stakeholder made different sense of the nebulous future by looking at disparate aspects of it. What they saw seemed uncertain, while what they did not see, did not seem particularly uncertain or even noteworthy. The business planner worried about positioning against competition while the field person worried about identifying the right potential customers. They partitioned the product into separate sources of uncertainty, which kept them from developing a more comprehensive understanding of the market. As in the Purser et. al (1992) study, integration mechanisms failed because differentiation mechanisms were not adequate to enable the perspective taking required for effective communication and collaboration. A second theme characteristic of failed teams involved people's understanding of the development process itself. Each department concentrated on different subsets of the overall process. People not only ignored the activities of others and failed to argue over relative priorities, they completely glossed over the concerns of others, and tended not to appreciate their complexities. Once again, it was a failure of perspective taking a failure to represent and appreciate the different knowledge and understandings involved that led to an inability to integrate their efforts. In a sense, it was a failure to adequately differentiate in the first place that led to a failure to integrate.

A third theme characteristic of failed teams involved the different 'thought worlds' of team members. Diverse pockets of knowledge and expertise in the firm belong to different "thought worlds" (Douglas, 1987) with unique understandings of the activity of the firm. Two aspects of thought worlds are relevant to product innovation: their "fund of knowledge" or what they know, and their "systems of meaning," or how they know (Fleck, 1979). What is already known influences the method and content of cognition. A thought world evolves an internal system of meaning which provides a "readiness for directed perception" based on common procedures, judgments, and methods. Thought worlds with different funds of knowledge and systems of meaning cannot easily share ideas, and may view one another central issues as esoteric, if not meaningless. So ideas that do not fit in with one's system of meaning may be reconfigured or rejected outright.

For new product development, departmental thought worlds can selectively filter information and insights. Because of different funds of knowledge, a certain thought world is likely to best understand certain limited issues, but to ignore information that is equally essential to the total task. This would also reduce the possibility for creative joint learning, since members of a department may think that they already know everything (Dougherty, 1992).

Thought worlds can have an all pervasive influence on an actor's perception and interpretation. As Dougherty found in her study, each departmental thought world was truly concerned with the successful development of the product. Each had an important insight into the product or market that was essential to the new product's development. However, each emphasized different aspects of development, and conceived of the whole in a totally different way. As lucidly worded by Dougherty (1992) "Nor is the problem like the proverbial set of blind men touching a different part of an elephant. It is more like the tales of eye witnesses at an accident, or of individuals in a troubled relationship- each tells us a "complete" story, but tells a different one" (pg. 191).

In summary then, the problem of integration of knowledge in knowledge intensive firms is not a problem of combining, sharing or making data commonly available. It is a problem of perspective taking in which the unique understandings of different thought worlds are first made visible and accessible to others. Making and exchanging representations of one's knowledge and understandings enables others to better anticipate the distinct ways of knowing of that thought world as they attempt to communicate. The problem of integration in knowledge intensive firms is a problem of supporting diversity of knowledge in order to strengthen the differentiation of thought worlds within the firm. Only after knowledge is differentiated and represented do the actors have something to integrate through communication.

Facilitating the 'Perspective Taking Process' as Information Systems

Intervening at the level of knowledge structures, interpretive schemes or 'thought worlds' and bringing them to conscious awareness in a process of mutual dialogue is essential to facilitate the perspective taking process (Mason and Mitroff, 1981). According to Dougherty (1992) successful product innovators created collaborative mechanisms that took into account their unique interpretive dynamics. Interactions at this core level of understanding facilitated appreciation of each other's perspectives, and consequently their unique knowledge could join together to produce new insights and new facts. Interestingly, the traditional integrative mechanisms, such as project teams and matrices, structures that are often recommended for innovation (Tushman and Nadler, 1986), did not help in the mutual exchange of perspectives. Advocating common tools and processes, the infusion of external market information, and the redesign of organization reporting structures, although important, are not enough to support the knowledge intensive firm. Information systems can, in addition, pay conscious attention to enhancing the development and representation of multiple, unique interpretive schemes that shape and frame how people make sense of their work. Surfacing interpretive schemes enables the explication of hitherto tacit knowledge (Polanyi, 1967) and extends a space for deeper self-reflection of one's interpretations. The process can be evocative since it can reveal an individual's personal cause and effect logic. This in turn forces the individual to confront the reasonableness and validity of tacit cause-effect understandings. One way to develop complicated understandings of a situation is by making it possible for individuals

to portray their original understandings of a situation, self-reflect and re-examine these displays and come away from those re-examinations with different interpretations and perspectives of what they might mean (Weick, 1990).

In sum, developing a comprehensive knowledge base among a community of highly differentiated yet reciprocally dependent individual specialists requires an on-going process of 'mutual perspective taking' where individual knowledge is surfaced, reflected upon, exchanged, evaluated, and integrated with others in the organization. There are a few, isolated examples of systems that seem to truly respect the diversity of knowledge and ways of knowing in the modern firm. These are a beginning for supporting differentiation in the firm. We will review some of them below, but the central point of our paper is the need for facing up to this new horizon of system development highlighted by knowledge intensive firms, and inventing ways in which diversity in knowledge can be supported through information systems. None of these examples is "the answer" for the problem of differentiation and integration of knowledge. But they do suggest some beginnings.

One set of alternatives involve blackboard like systems such as post-mechanistic groupware (Johnson-Lenz & Johnson-Lenz, 1991) or Amsterdam conversation environment (Dykstra & Carasik, 1991) which provide open ended spaces for users with minimal amounts of structure. The focus is on stimulating interaction rather than producing a product out of the interaction. It is up to the users to structure their environment and interactions instead of relying on a structure provided by a task-oriented application. Another approach to valuing diversity of knowledge in the modern firm is provided by OVAL (Malone, Lai, and Fry, 1992) in which four primitives (objects, views, agents and links) are defined by users to build a knowledge representation and communication tool that can reflect their unique way of knowing. Different knowledge representations, developed by one domain of expertise can be exchanged through a mail system with members from other knowledge domains, thus beginning the perspective taking process.

Cognitive mapping tools are increasingly being used to represent knowledge of an organizational domain. COPE (Eden, 1988) is a general purpose cognitive mapping tool that has primarily been used to construct group understandings. SPIDER (Boland, Tenkasi, and Te'eni, forthcoming; Boland, Schwartz, Tenkasi, Maheshwari and Te'eni, 1992) uses cognitive maps as one element in a hyper link environment for depicting an understanding as a set of contextual layers of representations. In SPIDER, a cognitive map may be the central document in representing an understanding, but each factor in a map is in turn linked to other maps, spreadsheets, graphs or text for revealing underlying assumptions, layer by layer. In contrast to Eden's work, SPIDER is designed so that diverse understandings can each be represented separately and can be exchanged, analyzed, and used as a basis for dialogue among knowledge workers. Information system developments, like those mentioned above, break with the theme of integration that has dominated information systems for the last three decades, and begin to explore the issue of differentiation and the support of diversity of knowledge within a firm. As other systems are developed to address this new frontier of knowledge diversity and perspective taking, a new set of research questions should open up. Some research issues that intrigue us include the quality of organizational trust, the process of self revelation, the quality of interpersonal dialogue and the effectiveness of organizational learning.

Systems that support knowledge diversity and perspective taking should result in an increase in organizational trust (Zucker, 1986). Representing and exchanging ways of knowing and enabling an improved perspective taking among organization members should lead to increased confidence in the knowledge of the firm and to the experience of successful collaboration with others, both of which would be associated with increased levels of trust.

The surfacing of tacit assumptions during the process of building representations of distinct ways of knowing should also be associated with an increase in self revelation, or the putting forward of beliefs and ideas that are normally kept to oneself. An increase in self revelation would also be expected to lead to an increase in organizational trust.   Finally, the impact of systems that support knowledge diversity would have little point if the dialogue in the organization -the perspective taking behavior- did not improve as a result. Better dialogue would in turn be expected to result in improvements in organizational learning.

These research themes can only be hinted at here. Our community's focus on integration, emphasizing shared and common knowledge, data, and models has not stressed their importance, and to be honest, we do not have a good way to think about trust, self revelation, or dialogue right now. As our attention shifts to questions of differentiation, however, and to questions of better supporting the development and representation of unique, diverse knowledge within the firm, we expect these issues to gain importance and our ability to conceptualize and measure them to improve.

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