THE NEW 'KNOWLEDGE SPEAK': THE IMPLICATIONS OF CONTESTED DEFINITIONS OF KNOWLEDGE AND INFORMATION

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ABSTRACT

This paper presents a critique of notions of information and knowledge found in the management literature and amongst proponents of 'knowledge management' (Davenport and Prusak 2000) interviewed in the course of a study of changing operations of the Federal Government of Canada vis a vis the 'knowledge-based economy' as it is found in Canada (Shields, Taborsky, Jones, and O'Hara 2000). Interviews with a range of Federal Government Departments and Agencies on a number of topics including knowledge management were conducted throughout the Summer of 2000. During these interviews a number of competing definitions and numerous misunderstandings of the relationship between knowledge and information emerged.[42] We will distinguish and contrast these with definitions derived from semiotic and information science frameworks. We argue for the importance of the collective and processual nature of knowledge. Our conclusions allow us to specify the shortcomings of existing knowledge management approaches and to identify a necessary and specific focus for future knowledge initiatives in organizations.

A PUBLIC SECTOR RESPONSE TO THE KNOWLEDGE BASED ECONOMY

Following international trends in government and private industry, the Canadian government is moving to define Canada as a 'knowledge based society', characterised by what is loosely labelled as the 'knowledge based economy' (KBE). In its 1999 Throne Speech, the Canadian government challenged citizens and the public service to embrace necessary changes in ways of working together and in understandings of the importance of information as an economic asset:

> 'Knowledge and creativity are now the driving force in a new economy - our human talent, values and our commitment to working together will secure Canada's leadership in the knowledge-based economy.' (Throne Speech: 1999).

Over the last several years the Canadian public service has responded to this emerging orientation through a number of proposals and strategic initiatives. Adopting the language of a select group of management consultants (Wenger and Snyder 2000; Wah 1999) and following similar steps taken by private sector firms to integrate IT into their business processes, the public service has focussed a set of initiatives around what is referred to as 'knowledge management' (KM). These initiatives have included the facilitation of information exchange and problem solving by adapting email software, providing information to clients via World Wide Web directories and information pages, and heightening awareness of the need to share information within units by establishing Chief Knowledge Officer positions.

At the heart of these initiatives are notions of knowledge and information. These definitions are derived from technological sources (such as IT), from lay interpretations of definitions presented in philosophical classics (Aristotle), from ad hoc ideas generated in discussion and brainstorming groups and from the management literature, which continues to inflect and imbued the terms 'information' and 'knowledge' with new connotations in the search for concepts that harness the evocative power of the symbolic. Although we recognise the challenges of operationalising a concept like 'knowledge' within the time horizons of public-, not to mention private-sector organizations, the definitions of these key terms are buffeted about in language such as 'infodynamics', 'knowledge work', 'knowledge workers' and 'the knowledge based economy'. What is the difference between knowledge and information? Is it valid to say that our understanding of the nature of knowledge itself is changing - and could the de-anchoring of the classical notion of knowledge be the reason that this term is suddenly 'sexy' and available for redeployment?

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'KNOWLEDGE-SPEAK' - SOME POPULAR DEFINITIONS

Knowledge Management is a term that has originated in think tanks on private sector productivity and in schools of management in the United States. KM proponents always cite the same consultants and writers. These common reference points reflect the important role of a small number of KM conferences and texts in disseminating the approach. Works or presentations by Prusak, Davenport and Denning (2000) so on are the sources of a number of key terms, but in practice there is a diversity of approaches. For example, in one Canadian Government document, Hunter provides this gloss:

> **Data** are facts, observations, or measures that have been recorded but not put into meaningful context. A single musical note is data.
> **Information** is data that has been arranged in a systematic way to yield order and meaning. A series of notes arranged into a tune is information.
> **Knowledge** is information in the mind, in a context which allows it to be transformed into action. A musician is able to play a tune because of his knowledge (Hunter 1999:np).

This stimulus-response model takes the arrangement or processing of data to yield information, and the arrangement or processing of knowledge to yield action. A mechanical input-output process is presumed in which each state of data, information or knowledge, is presented as an object which is itself unchanged by the knowledge process, but which, in a serial manner, leads to the next stage. That is, they are all operating within a mode of discrete detachment. These definitions are representative of the language we have found in our survey. In both theory and practice, these models create problems because they do not clarify the nature of and the relationship of information to knowledge and the dynamic nature of knowledge as a process. It is often unclear to individual officers how information and knowledge should be applied in practice and how strategic choices could be made between different knowledge and information management systems. Essentially, this current model operates as a traditional classical or Newtonian mechanics, which establishes our reality as made up of discrete 'things' and examines how these discrete entities interact with each other either singly or collectively. If we translate this process into semiotic terms, we find a dyadic architecture where a discrete signifier or object will be bonded to its equally discrete signified or meaning. Such a mechanical semiotics sets up a scenario where all interactions are, whether random or 'brute force', direct and unmediated. We see this architecture represented in numerous definitions of information and knowledge within the current management literature.
In other discussions, definitions are more thoughtful but left implicit, buried in details or their implications are not clarified. The social dimension is implied but these discourses quickly turn to an individualistic perspective.

> 'Knowledge has a whole host of attributes. It's alive not dead, which means you can query it. It has subtext and interaction. Some kinds of knowledge just aren't easily captured in documents... Try explaining to someone how to ride a bicycle... The more multidimensional knowledge is, the more difficult it is to stuff it into a flat report. It flourishes in, and is nourished by, conversation' (Prusak 2000).

Like Euclidean geometry and Newtonian mechanics, simplified definitions have worked for over sixty years for those involved in manipulating information. However, knowledge management claims to go beyond mere information gathering, storage and retrieval. As a form of management post-modernism it is presented as something above and beyond, a sort of 'quantum theory' which abstracts, yet unifies the entire field of organizational phenomena. It aspires to produce not only timely decision-making and understanding but wisdom:

> 'Ghandi and Martin Luther King created a vision of their world in their time by declaring "I have a dream"... The true promise or alchemy of the knowledge economy will be to make individual weaknesses irrelevant as we maximize individual and community strengths' (Nicholson-O'Brien 1999:32).

Following from these definitions we wish to provide some critical reflection. We focus on the interaction between knowledge and information because their relation is not a one-to-one process which sees both as 'things-in-themselves', with information possibly imagined as a 'billiard ball' and knowledge imagined as a 'collection of billiard balls'. This mechanical outline of information and knowledge considers that change can result only from an external force with the power to disperse or collect and re-categorize those billiard balls. But this architecture is unable to describe a generative process of information and knowledge development. Important: such a dyadic semiotics ignores the necessity for a third system, a memory structure that is not merely

a collection of units but is a generative mediate process of establishing relations between those units. What new understandings would be required to break with the established focus on manipulating information - a model which is a staple of textbooks and the basis of multi-trillion dollar global IT and management consulting industries?

CRITICAL DEFINITIONS

We must therefore begin with definitions of information and knowledge. Much of the language currently used to distinguish between them is at such a high level of abstraction that it is not only difficult for bureaucrats to understand, but it risks becoming meaningless; it is reduced to the level of rhetoric – i.e. intentionally persuasive and overly extravagant.
Therefore, we find it helpful to provide our own definitions and to highlight some of the operational considerations that can be used to better focus these definitions.

Information

Definition: Information is data - a precise descriptive measurement or representation of matter. Information is both locally **contextual** and **relational** and we can assign a definite quantitative and qualitative description to this data.
Semiotically, it can be defined as 'Secondness', 'a mutual action between two things regardless of any sort of third or medium' (Peirce.1.322), and it operates in that interaction as 'an act of arbitrary will or of blind force' (Peirce 1.328). That is, the relation is not interpretive but mechanical.
Operational Considerations: When information, in this state of Secondness, is transmitted from one context or place to another, it must be placed in a contextual bond to information in the new locality to provide that basic dyad of a 'mutual action'. If we were to transmit this type of information as isolate 'bits' without that contextual lock, it would quickly dissipate to a semiotic state of vague Firstness, a 'state of unawareness of anything else' (Peirce 1.306). It would be meaningless. How does one transmit a discrete unit as well as its precise relations? What is required is a condensation of this linked sign-interaction into a more general sign, which can then be moved to a different locality, where its generality enables it to 'lock into' and express itself within an entirely new local context. When information about one context is integrated with information about other contexts, this expansion-within-generalization becomes **knowledge** to the actors working in those different contexts. The next step of transforming this general knowledge into localized and pragmatically operational information allows it to then become manageable as a *new* knowledge that reflects the new context. Therefore, one needs to ensure that there are people and processes that function as *'translators'* or *'systems of mediation'* who can broker the transformation of information out of one context, into a form of generalized knowledge, and then into a new form of information in a different context. Our interviews indicate that these skills are held by traditional groups of 'knowledge professionals' and that it may be difficult for knowledge to move outside of these groups. This insight was also supported by comments made by interviews with senior managers regarding the problem the quality of knowledge and information in the public service.

Knowledge:

Definition: Knowledge is an analytic operation on information. Knowledge is a mediate process of generalization and semiotically can be understood with the Peircean process of 'Thirdness,' which is 'the medium or connecting bond' which acts as a 'synthetic consciousness' (Peirce. 1.377). This operation must be understood as an interpretive process, for 'brute action is secondness, any mentality involves thirdness' (Peirce 8.331). Knowledge, as that mediate process of Thirdness is a generative and future-oriented and evolutionary process of dynamic interpretation. Bakhtin refers to this mediation process as 'dialogism'; it requires a transactional process between elements (i.e. information; Bakhtin 1981). It develops the normative habits, the 'quiescent memory' that underlies all specific interactions of a community and as such a normative process, it is 'a matter of law, and law is a matter of thought and meaning' (Peirce 1.345). Neither knowledge nor information are static, but part of a **'knowledge process'** and **'knowledge networks'**. When it does take a monological form it ceases to be knowledge, rather it is information. Thus a knowledge process involves a phase change mechanism between a reified state of Secondness (information) and an energized, fluid, dialogical state of Thirdness (knowledge).
For example, one worker records the dimensions of a restaurant, walking physically back and forth with a tape measure. Only a small amount of what this person learns and knows of the building is recorded, set apart and highlighted as information and importantly, may not become part of the knowledge-base of that particular worker or even of that worker's knowledge-community. Long after this information has been gathered and archived a building regulation worker patiently translates fire regulations, understood as 'Law' or the mediate

generalization of Thirdness, into the specifics of the limited number of patrons that the building, within its particular dimensions, may safely contain. Without that mediative triadic process, the insertion of the constraints of regulatory habits, the possibly dangerous future relationship between the basic dyad –the dimensional space and the number of occupants –could never be established.
Operational Considerations: This can be summed up by stating that *knowledge is a social or collective operation of generalization and the development of normative habits, while information is the property of an isolated context.* Knowledge is processual. It only emerges via relating and exchanging different pieces of information, which undergo changes in that process. Of central importance, is the suggestion that knowledge is embodied within collectives and communities and is an interpretive rather than reactive or reflective process. To return to the billiard ball analogy, knowledge is not the collection of balls but the rules of the game. And, although one can 'shoot pool' by oneself, to really 'play billiards' requires an opponent and thus a dialogical social context of several players (or at least one must play at being one's own opponent, but thereby imagine a social setting).

Knowledge Networks:

Definition: Within the understanding that knowledge is embodied within a collective, then, we must understand both knowledge and information as part of a **dynamic** and **evolving** network of relations within communities. Information is the specific and local articulation of knowledge about the world. Because knowledge exists at a higher order and scale, and is never completely formally articulated, it will continually evolve as information is passed between and articulated within the different contexts of the community or even, communities, of users. Even archived data must be reassessed and rearticulated to be meaningful or informative.
Operational Considerations: Therefore, one cannot assume that there is a static stock of knowledge, much like that collection of billiard balls, which an organization possesses and which can be accessed by all workers at any given time. Knowledge is dynamic and abstract rather than discrete. As people meet new situations, knowledge will, in its nature as an evolving process, engage in establishing innovative links, which will be articulated in novel units of information, which will themselves be used to revise that knowledge-base.
In each of our definitions, knowledge is continuous, relational and abstract. It can be flexibly applied across contexts and holds the potential for innovation by being adapted to different contexts in which it must be re-articulated. Information is the specific, local articulation of knowledge. Our definitions see no distinction between data and information – both are local, codified and organized – and we resist ascribing essential normative qualities to communities (e.g. people with passion) because knowledge is an emergent quality continuously reworked by those communities of information users. Because knowledge cannot be reduced to a specific single-voiced articulation (i.e. information), knowledge itself cannot be directly managed. In short, while one can manage how information moves in an organization, one cannot manage knowledge. These distinctions are not recognized within much of the language of knowledge management. This is why KM proponents often end up proposing information technology solutions to the social barriers to knowledge work within organizations:

> What you get by adding multimedia is closer to the real – face-to-face – than a document...
> ....
> The firm can make knowledge visible so people will know where the buyers and sellers are and what is being sold... Companies are tackling this with things like electronic "yellow pages," directories or maps of knowledge-holders across the company... you could annotate complex documents with contact names... (Prusak 2000)

KNOWLEDGE NETWORKS

With these definitions of knowledge and information in mind, we move to consider who / what is involved in promoting knowledge management initiatives and who / what has raised concerns about them. We will describe a network– not as a map of a discernible reality - but as the means of conceptualizing the ways in which various actors (human and non-human, including databases, technologies, sets of rules and so on) come together and interact to construct complimentary or competing definitions of what knowledge management should, or does, entail.
Information Management (IM) is claimed to be distinguished from Knowledge Management (KM): the former has to do with organizing information so that it is easily accessible to all employees (e.g. creating interactive and searchable databases). Knowledge Management concerns the organizational and 'cultural' changes needed to encourage people to share information and to use IT tools. Knowledge management initiatives often situate IT, IM and KM within varying relations to one another, at times stressing one element over the others. Often KM is seen as integrating the other elements by positing it at a higher or more authoritative level of operation. The

attempt to distinguish these points to a struggle between individuals for recognition and between organizational units for resources and control of how to best achieve departmental mandates.
The inconsistent, uneven and sporadic ways in which knowledge-based initiatives are being pursued across and within Departments in our case study makes it difficult to come up with a clear and stable set of 'Canadian Government' knowledge management definitions. Competing definitions of knowledge and information have emerged. These are anchored more in the politics of knowledge than in the ontology of knowledge. For example, what might be labeled knowledge management in one department, or departmental branch, might be labeled information management or electronic document management for strategic and political purposes in another. Similar projects are positioned and championed within differing locations of the organizational structure; sometimes overtly visible, while other times virtually invisible. The unevenness of knowledge and information definitions and procedures reflects the fact that KM in its present form does not involve radically new concepts. After all, institutions have always engaged in some form of information sharing initiatives but these have generally operated within the 'billiard ball' model of Newtonian mechanics, a process operating within a dyadic semiotics, which operates by transferring rather than transforming information. It follows that the agendas of political control will be reflected in the differing priorities, operational contexts and histories within this mechanical relocation of information.
To illustrate these problems of both definition and operation, three heterogeneous and overlapping groups were found within the core workforce of the Public Service. All are important to consider in relation to all knowledge and information initiatives. It is important to remember that even within and amongst these groups the idea of knowledge management is usually limited to a localized collection of individuals and not spread evenly across the entire organization:

KM Proponents

Within management there are a group of KM promoters who share a similar vocabulary and vision as to what KM should be. Generally this coincides with the definitions and goals of KM in the management literature. However, these managers tend to be isolated within special KM / IM offices and projects The KM language is by no means universal to managers in the Public Service. It appears that this group is still largely removed from dealing with the practical operational details of KM proposals, operating instead as spokespersons, champions and KM / IM 'boosters'.

IT Specialists

As many of the public service's knowledge management initiatives were either originally developed, or continue to be developed, within Information and Informatics branches, this group of KM promoters overlaps considerably with a second group of IT specialists and informatics managers. This group is central to any KM initiative, but presently they appear to be operating separately and at a more pragmatic level. In some cases IT specialists have adopted the KM language with a stronger technological focus and less focus on the implications for the social organization of day-to-day work and the cultures of their organizations.

Operational Workers

This then leads to a third group- workers involved in the day-to-day operations of government and the provision of services. This may include groups as diverse as service delivery personnel and research scientists. What is common here is that the KM language is not in use in the day-to-day activities of these groups. Many had not even heard of the idea of KM prior to our interviews. However, the operational workforce may be involved in a KM initiative without giving it this label. In addition, when speaking with people from this group one gets the sense that efforts to produce and disseminate knowledge, to share information – whether through the use of IT or better organizational practices – have always been part of their jobs. Because they do not share the language, and in some cases are alienated by the rhetoric, knowledge management initiatives are often distrusted.
Not only do various uses of the terms information and knowledge jostle with each other but different interest groups such as the three above emerge out of their different positions in a knowledge network and different relationships to information and to the knowledge process. Beyond a network of bits of information, some of which is held by individual bodies and not part of any data infrastructure that an organization may have established, there is thus a cleavage of individuals and offices into distinct knowledge classes or groups.
Our definitions of information and knowledge stress the importance of recognising that information and knowledge are distinct and yet operate in their uniqueness within a dynamic interactional communal process. We found that information is reflected upon and abstracted into knowledge collectively by a community of information users. In sociological terms, these communities are formed around an abstract process of knowledge generation, understood as a 'communal memory', which is brought together and actually engendered by the

patterning of information flows related to the specific projects and services of that community. What designates a collection of individuals as a community of information users, and delineates one community from another, is not an overriding cultural norm or unifying means of identity, but the *communal* ability to take-up, communicate and adapt to specific, contextual and rapidly changing information processes in a different manner than another community.

On the basis of our research we can, for example, specify that it is knowledge which is the key element in the everyday 'habitus' of social groups and classes (i.e. 'knowledge networks'), thereby extending the work of sociologists such as Pierre Bourdieu (1977). In the very concrete approach we have taken, knowledge, not the performance of normative codes (see Bell et al 1999 re. 'performativity'), is the content and operative matter of such theories of social reproduction and cohesion. As a collective goal, tradition, or the components of a world view, knowledge is the 'glue' that gathers and maintains communities (see Gadamer 1977).

We of course do not mean, with this reference to 'knowledge as glue', only cognitive ideas or brain states, but that different human bodies with varying capabilities and the entire physical, digital and cultural infrastructure and procedures of information and of an organization, participate in its knowledge networks (cf. Latour 1993). The distinction between knowledge networks and knowledge itself lies in the former's materiality and ability to materialize knowledge, that is to express it as information that can be applied pragmatically. Knowledge also has its own historicity. Knowledge networks in organizations such as the Federal public service are advanced and effective at concretizing knowledge into information compared to, for example, a feudal court. But where other societies valued knowledge in the form of tradition, for example, modernity emphasized the rule of monological information, that is, knowledge as statistics – to great technological and economic advantage. Modern bureaucracies (whether public or private) are a social form of cybernetic control. They operate by transforming knowledge into information and thereby allowing it to be moved in a fixed, mechanical or monological state between offices in the form of memos, directives, rules and so on (as one of sociology's founders, Max Weber decried when he wrote of the 'iron cage of rationality'). Hence the humanistic rhetoric in the call for balance, by KM proponents.

A change in our understanding of knowledge would entail recognizing its difference from information, something we 'moderns' have all trained ourselves out of. We hypothesize that recognition of the shortcomings of cybernetic command and control is happening across many societies in the wake of climatic change, health man-made disasters and systems failures. In part these are due to unexpected consequences, externalities and bifurcation points. But this signals a situation in which the status and relevance of information to any given decision is not clear. How wide a scope of variables, of information sources or points of view should be included in an organization's knowledge network? This is not the place for a discussion of the 'risk society' hypothesis (Bech 1992) but it would appear that the degree of legitimation and trust in bureaucratic knowledge networks which operate monologically, at the level of information, is being challenged by demands that these organizations develop networks that operate at the dialogical, heterodox level of knowledge in order to include more forms and sources of information and to better anticipate sudden shifts in the organization's environment.

As knowledge processes and information have become global and operative within diverse communities, so the 'politics of knowledge-communities' has become more critical. In an acutely global economy, membership in a community of information users is not restricted, but is fluid and evolving. Outside the core workforce of the public service, networks of other groups in privatized agencies, consulting firms, recruitment specialists and broader networks such as professional and scientific communities extend one or another of the internal groups. Individuals participate in a variety of communities and to various degrees and levels. For, example a scientist can simultaneously be a member of the international community of science, a practitioner of interdisciplinary theories, a member of the Canadian Public Service, a member of a departmental research branch, and the member of a variety of work groups and informal networks. Although communities of information users are neither fixed nor homogenous, their members often share similar backgrounds and means of communication, such as language or documentation, over a long period of time. This can lead to the development of a knowledge-base, that 'quiescent memory', that operates as a constraint rather than a dynamic process. Therefore communicating across different knowledge cultures can be a basic obstruction for those wishing to better communicate information across, or between organizations. Whether a policy worker, a scientist or an aviation inspector, it can be difficult to successfully communicate information to people who do not have the same skills or experience, the same 'knowledge-base'.

However, the barriers that exist between different knowledge cultures - between communities of information users - are not limited to political agendas, nor to language or even the mechanical means of communication. Instead, differences in the actual procedures by which knowledge cultures generate, store and communicate their information may establish these cultures as isolate and closed. For example a scientific terminology is not simply an alternative means to relay information, but is grounded within a specific methodology (i.e. experimentation) formalized in scientific institutions and reinforced by the credentials it grants its members. Scientists have been very good at sharing information within their disciplinary community through journal publications, conferences and informal scientific networks both across and beyond the Federal Public Service.

Where scientists fail to communicate information is with other communities of information users within an organization and more broadly with the Canadian public at large. These failures are particularly evident when scientists are asked to consider alternative and sometimes contradictory knowledge approaches to a specific issue or problem. For example, at Agriculture and Agri-Foods Canada, interviewees suggested that knowledge management has been met with considerable hostility by the Research Branch. The innovation and preservation of knowledge is perceived as the domain of the scientist alone; their fears about the degeneration of the soundness of this knowledge when it is translated into other knowledge networks, for non-scientific users including policy analysts and the lawyers who draft legislation, have meant that initiatives which acknowledge the value of other knowledge communities have been discredited and discarded. The problem of the reliability of information and its potential degeneration when its context changes cannot be ignored. How is this to be dealt with?

THE COMMUNITY OF INFORMATION USERS

Abstract notions of KM / IM which treat knowledge and information as simple, static objects, that are moved in a Shannon mechanical process from one site to another site obscure the durable cultures, structures, relations of power, and physical infrastructure and representations of information (e.g. limited access labs, IT databases or paper documentation and records) which actually shape the way in which information flows and how it is interpreted in an organization. This dyadic semiotic frame ignores the vital process of a level of mediative interpretation that enables the development, not only of knowledge, but also of the transformation of information between disconnected knowledge communities and cultures.

Information is contextual – i.e., it is the specific 'know-how' needed to perform a particular task. Knowledge is decontextual, it is interpretive and general. However, knowledge never takes the form of an object. It comes to rest, so to speak, only when transformed, within a local context, into information. Knowledge is abstracted from information by a community of users, and in turn, its mediative general representation allows a person to adapt and apply information to a different situation. Knowledge, therefore, is an emergent property, it cannot be managed as a discrete entity and must be allowed to continually evolve dialogically. Therefore, the language of knowledge management – with its emphasis on sharing information – obscures the fact that in practice one needs to focus, not on simply moving information (which can be a process based only around its nature as a discrete Secondness) but on transforming and interpreting that information to a new context. Therefore, the current misinterpretation of the different natures of information and knowledge have led to a dysfunctional KM process that operates as a mechanical model of packaging and moving informational 'bits'. Rather than attempting to manage knowledge by reducing it to these collections of data-bits, which are then 'shipped' from culture to culture or office to office, and end up as that meaningless, nebulous Firstness, the focus should be on developing communities of information-users and understanding disabling elements of the existing knowledge network. Thus, the development and operation of a dynamic and plastic dialogical community of information-users should be the focus of KM.

The globalization of corporations, growth of international institutions, increasing flows of international communications and the use of information and computing technologies (ICTs) in the workplace changes the processes of both the production and dissemination of information.

Communicating information across barriers is not simply an act of translation, but of transformation. Information, to be pragmatically operative in a different locale, must be decontextualized from its former relations, transformed into the general qualities of knowledge, and then, transformed yet again, by its new community of users, into information that is pragmatically operational in the new situation. As Peirce frequently pointed out, semiosis is an infinite process of interpretation. A diverse and ever-expanding community of users must develop processes that can perform this interpretive dynamics. It must be understood from a truly organizational perspective, not 'in the sphere of the "I" but in the sphere of the "We" (Gadamer 1977:65).

How can it do this? First, the information in all these cultures or 'realms of discourse' must be accessible. The political and hierarchical barriers must be eliminated. Second, the users must accept the necessity for on-going interpretation. Information must be understood as open and, in this sense, future-oriented. It cannot be assumed that it will remain in a monological form of discrete Secondness. It must be interpreted and transformed within each local context or office. These first two processes require a constant 'hum' of discourse, based on an understanding of the risks and consequences of this triadic ongoing semiosis.

There is yet a further requirement. Information/ knowledge, in order to be useful, that is, to 'do work', must be pragmatic. Information/knowledge must be accountable to that which it interprets. The community of users will acknowledge that information and knowledge will of necessity have an intention to, at some time, reflect or properly interpret our external reality. We are not advocating, in this outline of a flexible and interpretive semiosis, that these communities of users will produce a fictional discourse. Nor are we advocating that they arrive at a final discourse. Instead, a basic requirement of semiotics is that the signs that it generates must be pragmatically operational as reliable representations of that which they represent. Knowledge must 'be really

operative in nature' (Peirce 5.99), for genuine knowledge is viewed as a process that, itself, considers the effects it has on its surroundings. It is this form of pragmatic knowledge management which focuses on communities of information and knowledge-users, we conclude, that must be addressed by KM / IM initiatives underway in the Canadian federal government.

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