

# Information and Knowledge Economies

## *Work and Management in the Canadian Federal Public Service*

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**Abstract:** This research presents a critique of interpretations and management of information and knowledge as operative in the architecture of our modern global economy. Given the transformation of this economic infrastructure, we state that there is a concomitant need to examine and clarify the operative logic of expert systems and networks of knowledge. The case example we use is the nature of the knowledge-based economy as it appears in the Canadian Federal Civil Services. Archival research and interviews with a range of Federal Government Departments and Agencies on a number of topics including employment management practices and knowledge management were conducted. The archival research reveals profound yet articulated changes in the infrastructure of the work force. It became clear that there is a concomitant but disturbingly unarticulated change in the processes involving the operations of information and knowledge. We 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.

**Key words:** Knowledge, Information, Economy, Public Sector, Networks

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## 1. INTRODUCTION

A common taxonomy of data/information/knowledge used in the literature of knowledge management derives from the work of Gilsinan (1984) and Meltser and Bellavita (1983). From this perspective data are simple observations about phenomena, information is data that will make a difference, whereas knowledge is information that provides guidance for action by describing relationships between means and ends. For example, if data are discrete scores achieved on a test, when these data are arrayed to show that minority students do worse than non-minority students, the data becomes information. Further analysis might suggest the external factors involved in these achievement scores, and how we might manipulate these factors to change the results. This process of adding external factors transforms information into knowledge (see Gilsinan, 1984: 375). In a Canadian Government document, Hunter (1999) provides a similar taxonomy where: 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/her knowledge.

Current models of data, information, and knowledge take the arrangement or processing of data to yield information and the transformation of information into action as knowledge. 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. These definitions are representative of the language we have found in our interviews with public servants. In both theory and practice, these definitions create problems because they do not clarify the nature of and the relationship of data and information to knowledge and the dynamic nature of knowledge as a process. It is often unclear to individual management personnel in the public service how data and information should be applied in practice and how strategic choices could be made between different knowledge and information management systems. Essentially, these definitions and models define a reality made up of discrete 'things' and examine how discrete entities interact with each other, either singly or collectively, in a direct and unmediated manner. However, knowledge management claims to go beyond mere information gathering, storage and retrieval. It is presented as something above and beyond information processing as that which abstracts and yet unifies the entire field of organizational phenomena.

We begin by extrapolating and extending these definitions of data, information, and knowledge. While we find these basic distinctions useful, knowledge management discourse fails to make qualitative distinctions between the components of knowledge systems. Similarly, the relationship between these components are at such a high level of abstraction that they could be difficult to operationalize and implement and so risk being reduced to the level of rhetoric. In contrast, we wish to show how a reconceptualization can be useful in understanding the organization of knowledge as well as the organization and subsequent reorganization of public sector work and management. We explore these issues in the context of the Canadian Public Service.

## 2. CRITICAL DEFINITIONS

In contradistinction to the knowledge management perspective, we see data as abstractions rather than viewing knowledge as such. Here, data are qualitative and sensate matters that are prior to there being arrayed in a series, placed in a ready-made order or things, or made relative to other sensate things or places. Data elements exhibit affective qualities such as redness, smoothness, hardness, and so on, and in the absence of such qualities, data (and matter) would not exist. Because of the characteristic quality of being abstracted from relations or set apart from everydayness, data often take on qualities that are iconic (Peirce 1955: 109) or the characteristics that are of the event (O'Connor 2002, Patton 1996; Lyotard 1993). Icons and events are, by definition, not commonplace. This is because it is rare for data to remain abstract and the pure case of data rarely exists for long. Data are most always processed as information. They are put into a set (for example, of things that are red, or smooth) or are placed in mechanical relations with other things (by analogy, contrast, etc.).

Transformed into informational associations, data elements become formalized, arranged and compared, ranked and ordered, and so become localizable and contextually identifiable. Data becomes information when it is assigned definite relational qualities (which may be qualitative (that is, by being classed as this kind of red) or quantitative (an element of a set or subset). When information, as this discrete representation of sensate data, is transmitted from one context or place to another, it must be placed in a contextual relation to information within its new locality. If we were to transmit information as isolate 'bits' without a contextual lock, it would quickly dissipate to a semiotic state of vagueness, meaninglessness, just as our habits appear clumsy and gauche when they are enacted in places other than those where they gain their sense (Mafessoli 1993:10).

Knowledge is an analytic operation on information. It is a mediated process of generalization and can be understood as an evolving synthetic or cultural consciousness. This operation should be understood as an interpretive rather than descriptive process. Knowledge is a generative future-oriented process of dynamic interpretation. Bakhtin refers to this mediation as dialogism – a process requiring a third element to act as a mediator between dyadic operations (i.e., information, see Bakhtin 1981). Mediation both changes and develops normative habits. It is the ‘quiescent memory’ that underlies all dyadic interactions of a community and as such normative processes, 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 are 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 between a reified state of information and an energized, fluid, dialogical state of knowledge. In short, it is relational. As for the relation itself, it possesses another mediative character (i.e., a third quality) that is external to and qualitatively different from the differentiated elements that make it up (Deleuze 1981). From the standpoint of information, there is an immediate awareness of a relational difference and association of two, but there is no cognitive or reflexive understanding of the processes of mediation - this last falls under the category of knowledge.

It is when information about one context is integrated with information about other contexts, that this expansion-within-generalization becomes knowledge to the actors working in those different contexts. Conversely, the transformation of this general knowledge into localized and pragmatically operational information allows it to then become manageable as a innovation or 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 is often difficult for knowledge to move independent of these groups. This insight was also supported by comments made by interviews with senior managers regarding the problem of the quality of knowledge in the Federal Public Service, and amplified in part by the outsourcing of organizational learning opportunities that lie in the engagement with client groups and environments. It suggests that current attempts to simply make information on government policies or procedures available via the web will inevitably require much contextualization and possibly a legion of such ‘mediators’ to

answer the resulting questions on context and interpretation that the public will have as recipients of decontextualized data.

This process can be summed up by stating that knowledge is a social or collective operation of generalization and the development of normative habits and fields. Information is the property of an isolated context in a knowledge-delimited field of operations. Knowledge only emerges via relating and exchanging different pieces of data and information that necessarily undergo change 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. The normative case enables us to foresee potentially dangerous dyadic relations, but it would also allow us to foresee potential options to make a difference, to enhance advantages, and to explore possibilities.

### **3. INFORMATION AND KNOWLEDGE ECONOMIES**

The OECD claims that the economies of its member countries are facing a transformation comparable to the industrial revolution (OECD 2000:2). In this transformation, knowledge becomes a form of capital and therefore an intangible asset supplementing tools, money, and land. The recognition of this new economic element leads to changes in organizations and societies including the boundary between public and private spheres, the local and global scales, and concern for the accumulation and mobility of knowledge, its products, and its producers.

Anticipated as post-industrial society by Bell (1973), the new structure of economic relations are characterized by changing socioeconomic priorities including a shift from a production-centered to a consumption-centred orientation (Beck 2000, Bauman, 2001, Miller and Rose 1997), a change in the primacy of certain categories of economic activity (Bauman 2000) and the emergence of theoretical knowledge as the source of innovation and policy formulation (Bell 1973:14). These changes are also associated with a dramatic deregulation of labour force and changed “engagements” with the workforce from strong reciprocal dependencies with capital to characteristically weak ties (Granovetter in Bauman, 2000). As we see it, the new categories of post-industrial economic activity (derived in part from R. Reich [1991] cited in Bauman 2000) include: (1) symbolic producers or knowledge workers who function as information brokers, and who invent ideas and ways to make these ideas desirable and workable in different contexts, (2) the reproducers of knowledge workers such as educators or those who promote knowledge training, (3) client service employees, or

front-line workers, who engage in face-to-face service delivery, promote ideas, and tailor services to consumer and client demand, and (4) routine labour tied to assembly lines and computer networks. The latter the most likely to be involved in flexible working arrangements, not because they are 'unskilled,' but because their skills are easily abstracted and duplicated by information-based technologies. Changes in the structure of the workforce and its relations also have implications for structure and process of workplace organization and management.

In spite of these claims and changes, our research shows that managers and regulators tend to conflate knowledge with information and, in the public sector, the reification of knowledge is easily observed (Shields, Ilcan, O'Connor and Taborsky 2001). The corollary of this tendency to reify knowledge is that human agents are excluded from processes of knowledge creation and transformation. Instead, under the generic label 'knowledge-worker' are subsumed those charged with the service and support of information and communication technologies (ICT) that archive and transmit information. This model seems more specific to 'old' economies where labour theories of value are associated with stocks (accumulations of inventoried 'knowledge' arrayed in databases) whereas in the 'new' knowledge economy value is extracted through the management of flows. We say this because the new economy models of organization (Wilson 1999; Ofstead 1999; Carnoy, Castells and Benner 1997) tend to rely less on accumulated inventory and more on agile or just-in-time production systems and have less fixed inventory and less permanent staff to 'count' on (Allen 1999; Richards 1996). This model looks like a return to a model of the economics of primary staples coupled with a return of Tayloristic practices of scientific management applied to stocks and hierarchies of knowledge. We prefer to call this economic variant an 'information economy' because, like Castells' (1996) information society, it relies on instrumental knowledge tied to a point of application in production. It also parallels Taylorism, in that it reduces the value of knowledge to that which can be 'codified' in the form of databases and operations manuals, and therefore imitated or replicated at a distance (either spatially or temporally) by an end-user, or secured in a codified state to prevent access or for the purposes of control or to instill discipline.

Where humans are involved in the key sectors of the knowledge-based economy, it is in the managed organizational form of 'the team' or the virtual networks that traverse the boundaries of the conventional organization. Here, knowledge takes the form of social capital, reputation, trust, and the ability to get along with others in largely temporary forms of working arrangements involving both a permanent (core) and temporary workforce. These virtual networks attest to the presence of communal

knowledge systems that are dispersed among the interaction of actors and yet transcend each actor taken individually. This evanescent form of organization relies on variations of enterprise culture to structure relations and reduce the uncertainties and risks associated flexible working arrangements. These itinerant associations are risky from the point of view of the potential for opportunistic self-interest but this organizational form is also the source of innovation. According to several of our informants, the innovative potential of teams is not simply accounted on the basis of individuals (i.e., the recruitment of specific talent and expertise to a work team), but has more to do with collective problem solving capacities where personal compatibility, the ability to get along without having to 'look up' (to supervisors) to solve problems, and the ability to be flexible and multi-skilled to carry out team work. These factors generate collaborative 'office' environments with specific internal and regional geographies of work (including relationships or morphologies, proximities, scales). Many of our informants indicated that, because team composition changes phases of projects, teams tend to be issue-based, and the high turnover mitigates against long-term engagements. Here, trust and loyalty were not considered central to team effectiveness. Values such as effectiveness were more important than efficiency, and the probability of realizing this end is determined by the extent to which the team has the specific endorsement of its clients (often other departments or agencies) to do something. In this regard team-based working groups such as task forces are seen as least likely to get anything done because they lack specific endorsement while steering committees were most likely to accomplish something. Independent of the type of team one associates with, teams are important to career advancement because of the increased exposure they offer.

It is also important to note that risk management has become a central concern of the public service project managers. The department of Public Works and Government Services now employ risk assessors, who are 'contracted out' to other government departments on a 'cost-recovery-basis.' As a Public Works employee stated:

Whenever a department needs expert services on project management they come to Public Works rather than going to industry where it is more expensive. They come to Public Works because our fees vary and it is cost recovery... Whenever there is a major crown project, when there are big bucks, there is always a Public Works person on the project team ... Risk management in a project environment is to identify any risk that may detract from your schedule. If a risk occurs that means you've got to put more resources towards eliminating that risk. More resources mean more money so the project would cost more. So you go over your planned budget. So, what you're trying to do is mitigate the risks [or the] probability of a ... future

event ... The higher the probability and the higher the impact, the more you're going to mitigate the risk because you don't want this risk to happen.

In addition, we also discovered that policy analysts in central agencies and departments are being encouraged to subject their policy initiatives to risk assessment. One policy analyst stated that "Policy in the traditional public service sense ... has always been extremely risk adverse ... either that or we just follow the classic lines and hope for the best, and hope that people don't notice it." The incorporation of risk thinking and risk technologies in areas as diverse as the construction of transportation vessels to the development of social policy perhaps signals a shift away from the conventions of information management to knowledge management.

As intangible assets (accumulations of information and this broad, contemporary notion of knowledge) are commodified in the service-sector, private enterprise is brought into direct conflict with the public sector. Public services such as those offered by health care institutions have come to depend on a supporting infrastructure of private firms that provide specific diagnostic information (lab tests furnish knowledge and records of blood conditions, ultrasound scans and interpretations furnish anatomical knowledge, and so on). In Canada, the result is a veneer of services provided directly by the government - but all rest on a public-private 'knowledge economy' reflected not only in 'contracting-out' but the everyday networks and interactions of public servants and the providers of 'traditionally-public' services, such as workers in the health care sector. With the rise of what has been called network capital, or what we prefer to call the virtual organization, conventional divisions and boundaries and the reliance on the vertically integration of information systems and vertical control of information flows are rapidly giving way to knowledge networks and their virtual organizations.

### **3.1 The Reorganization of Work in the Canadian Federal Public Service**

The inconsistent, uneven and sporadic ways in which different 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' information and knowledge management definitions. Competing definitions of knowledge and information have emerged, anchored in institute politics and the desire of the private sector to lend still primitive IT, the gloss of knowledge management machines. What might be labelled knowledge management in one department, or departmental branch, might be labelled 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 (knowledge management) in its present form does not involve radically new concepts. After all, the Federal Public Service and all organizations have engaged in some form of knowledge network system. One example is the scientific system of peer-refereed journals. A traditional knowledge management system that has underwritten the order of academia worldwide and is undercut, at our peril, by commercialized academia.

All management strategies entail knowledge networks, for example, one of the central principles of the Taylorist/Fordist regime of workplace management was to entrench a distance that estranged cognitive work from practical work and limited the participation of practical workers in decision-making, planning, designing, and problem solving. In an effort to systematically control the labour processes, the first goal of this form of 'scientific management' became the abstraction and acquisition of the worker's tacit knowledge or know-how: "recording it, tabulating it, and in many cases, finally reducing it to laws, rules, and even to mathematical formula" (Taylor, cited in Wilson 1999: 677). This process of standardizing work entailed the calculated construction of a durable and repetitive set of associations and connections among persons, forces, and things in relation to very particular objectives.

Much like the dystopian scenario's sketched by Weber, Orwell, and Foucault, the primary aim of a Taylorist information economy was to achieve a vertical integration of working knowledge by making all those everyday associations known through surveillance technologies and creating extensive stock of information based on these observations. To control the work process one had to control the workers. The application of standardized routines and repetitive formulae demanded a permanent workforce, an elaborate systems of record-keeping, and surveillance technologies to oversee movements and the embedding of a disciplinary lifestyle and a taste for repetition, and to consolidate managerial capabilities to effect control from a distance. In this production-centred management system the objects of competition are producers. To compete required the development of a standardized workforce featuring long-term 'engagements' with labour. This long-term mentality amounted to the expectation that "the respective fates of people who buy labour and people who sell it are closely and inseparably intertwined for a long time to come" (Bauman, 2000: 146). While Taylorism aimed to control the movements of the workers, their associations with other workers, and their association with the materials of their work, it was less

suited to the control of worker mobility in terms of recruitment and promotion.

In the early establishment of the Civil Service in the late 19th century, the merit principle instituted the professionalization of work, particularly by standardizing practices that controlled the entrance and internal mobility of labour. By controlling these movements of labour, the merit principle produced a particular kind of public service sector that revealed, created, and governed regularities and competencies as well as established new social relationships of staffing and mobility. Reversing the principles of Taylorism, the triumph of merit meant that those with acquired skills and tacit knowledge would be rewarded both with permanent work and upward career mobility. That merit and only merit be rewarded consigned those with certain demonstrable knowledge competencies to the tasks of management and knowledge work while those who failed to display these special abilities were consigned to routine tasks and were made vulnerable under new systems of management.

Recent amendments to the PSEA (Public Service Employment Act) further complicate and challenge the principle of merit. Amendments give deputy heads the exclusive right and authority to 'deploy' employees from one group and level in the public service to any other group or level by mutual agreement of the employee and the new manager (see Chodos and Sulzer, 1998). This amendment signals the incorporation of what is termed 'enabling' or 'functional flexibility' (Zeytinoglu and Muteshi, 2000: 140) that is, the ability of organizations to reorganize the competencies associated with jobs so that the job holder is willing and able to deploy such competencies across a broader range of skills. Functional flexibility is concerned with the relaxing of job demarcation lines and the adoption of broader job descriptions, but it is also seen as a mechanism for achieving greater organizational mobility and adaptability (Morley, et.al., 1995). In this context, deployments allow management the flexibility to rapidly reconfigure human resources (see Meade and Sarkis, 1999: 243) and to deal with shortfalls in the supply of skilled labour by mobilizing the internal labour market and shifting resources to critical areas of an organization. Another amended section of the PSEA now grants further flexibility to deputy heads to layoff employees under circumstances of lack of work, the discontinuance of a function, or the transfer of work or function outside the public service. This amended change has strengthened the ability for management to contract out services (Chodos and Sulzer, 1998: 99-100). This brings us to other issues that currently challenge the standardization of public service work.

More recently, processes of destandardization, the development of a flexible workforce and outsourcing arrangements, have reorganized the

layered, structural depth of the traditional Federal Public Service in favour of a 'dialogic' or conversational micro-structure of not only people but also objects such as computers and their networks which bear the burden of communicating 'distanciated' knowledge and information transactions which are more stretched out in space and more compressed in time than previous.

Since the 1980s, a new division of the labour has been created in which three sectors can be identified within this new public service economy: first, a peripheral "lean" sector of arms-length contracted agencies who supply good and services for a mass market at low cost, often employing a contingent workforce of temporary employees and subcontractors; second, an "agile" specialist sector that is based on flexible production, quality and risk management which takes the form of public-private alliances characteristic of network capital and third, a core sector of permanent, but generic, multi-tasked 'knowledge workers' whose key functions are oriented toward research, policy and the management and oversight of outsourced services, and who are responsible for assembling, managing, and participating in virtual teams (task forces, steering committees, interdepartmental working groups, project-based work teams, etc.).

Professional unions are eager to be understood as knowledge workers involved in the translation of information between contexts. However, they share that sector and compete with a larger class of "frontline workers," whose unions (CUPE) are more concerned with gathering, accessing, and communicating information. These service professionals specialize in client services, the face-to-face delivery of information, and counselling, and work with condensed client groups to coach them in possible solutions through the use of available services. Promoting this service delivery orientation at the expense of knowledge work often leads to tensions within and between the various public sector unions. However, little credence is given to the fact that knowledge workers also engage in various forms of outreach activities (often requiring face-to-face contact) with their various internal and external clients. As one manager of research at Human Resources and Development Canada stated:

We're more evaluated by the products ... and we have a kind of commitment to providing high quality data ... on time ... and so we become more client-oriented. But at the same time I consider my employees as another client too, because they're the ones who are going to help me satisfy my external clients. So at the same time [the work is] driven by this client, you have to value the internal client too.

Being client-centred means treating all business associations as clients, to the point where everyone is a potential client of everyone else. The real distinction may not be whether clients are served, but how we understand

client relations from the point of view of knowledge work and the role of communication in the organization of this work.

For all of these groups, human relationships (at work, and more generally with clients and the public) are mediated by objects which are neither commodities (products), nor instruments (tools), but knowledge-objects (i.e. media). Expert systems (from manuals and self-help guides to online help and consultants) and information mediated by hardware, software and networks predate and outlive individual workers and experts. While many work groups prefer to be initialized in face-to-face encounters prior to relying on technological mediation, our interviews suggested the reverse, as one policy analyst commented:

“The initial contact can be e-mail to start with, but at some point you’re going to need human contact, and I think it’s important to have human contact . . . But it doesn’t have to be in the same proximity... There is an aspect that I think that’s not really looked at as much as it should be, it’s called video conferencing ... where you’re not in the physical location but you see people you’re talking to across these lines, and it does build it’s own ... excitement or at least builds people together in that absence, rather than ... what some people would consider a cold e-mail.

The cool medium of email does not lend itself to the intimacy of face-to-face contact either in person or by video. In such a culture, objects not only tend to carry an increased burden of social relations but are also seen as sources of knowledge and not just information. Objects, not teams or other people, become the contexts and settings within which a greater proportion of judgements are made. What is the function of these changes to the work force within the overall economic structure? Are these changes reflected in changes in the practices of dealing with data, information, and knowledge?

### **3.2 The Role of Government in a Knowledge Based Society**

A knowledge-based society is one that recognizes the processual nature of knowledge. Recognition of this would mark the changes from the information economy to the knowledge economy, but there is little sign of this to date in the Federal Public Service knowledge units.

What we see here is the development of a complex network of interactions, which mediate between the different sectors of economic production. Is there a mediative process within the knowledge processes of these different sectors, such that the different information specialties of each service can operate in a relational rather than differentiated and adversarial manner within the whole community? Given this new economic infrastructure - what is the nature of the new knowledge infrastructure?

Our definitions of information and knowledge stress the importance of recognizing that data, 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.

A change in our understanding of knowledge would entail recognizing its difference from information, something we 'moderns' have all but 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 disasters and systems failures that, as Beck (1992) argues, may well be of their own making. 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? 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 (Ormerod 1998; Tsoukas 1994; Nelson and Winter 1982).

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 not only do various uses of the terms information and knowledge jostle with each other but different interest groups such as the three aforementioned 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, as discussed above, a cleavage of individuals and offices into distinct knowledge classes or groups and into isolate networks do not have the same skills or experience, the same 'knowledge-base.'

The barriers that exist between different knowledge cultures - between communities of information users - are not limited to political agendas, 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, it was suggested by interviewees that the Research Branch has met knowledge management with considerable hostility. 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. One cannot be ignored, that is, problem of the reliability of information and its potential degeneration when its context changes. How is this to be dealt with?

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. 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).

### **3.3 The Community of Information Users**

Information and knowledge operate within a community and cannot exist without such users. Abstract notions of KM and IM (Information Management) which treat knowledge and information as simple, static and self-existent objects, that are moved in a mechanical process from one site to another site obscure the complex 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 emerges in its nature as a representation of data, how it flows and how it is interpreted in an organization (Ormerod 1998; Conrad 1996). This mechanical frame ignores the vital process of a level of mediative interpretation that enables the development, not only of knowledge as a continuous memory, but also of the transformation of information between disconnected knowledge communities and cultures (see analysis by Rosen 1991 on mechanical and organic processes).

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 mechanical information, that is, knowledge as statistics – to great technological and economic advantage (see Rose 1999).

Initiatives to manage knowledge and restructure agencies must acknowledge the generation of knowledge within networks of communities of users. On the basis of our research we can, for example, specify that it is knowledge that 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 worldview, knowledge is the 'glue' that gathers and maintains communities (see Gadamer 1977) and that in addition, generates new communities. Knowledge, however, cannot be predicted or controlled in a precise manner as if it operates as a machine, for it operates as a complex system.

This movement to a decentralized economy, affirmed with the legislation of rights, entitlements, and an emphasis on standardized (and collectively bargained) employment contracts, is further consolidated with the regulation of risk through flexibility and the focus on secondary labour markets. There are currently two dominant trends in the outsourcing (and insourcing) of service provision, both of which are focussed on networks. This form of relation, often referred to as 'network production' or network capitalism, involves businesses specialized in their core competencies relying on other equally specialized firms for key inputs and services (Clark, Heilman, and Johnson 1996). The first or earlier manifestation of the network is the trend toward simply buying the service on the market. These market transactions typically entail low-bid public auctions (Warrian 1996) where the provision of services is contracted to other organizations. This market-based outsourcing strategy is typically rationalized as a means of cost minimization and is driven by costs, so that the network of relations is fragile and the service provider easily replaced. The second and later trend involves outsourcing that sets up a stable network. These forms of networked arrangements include the use of pre-qualified ('trusted') contracting



companies and research consortia, and various forms of public-private partnerships such as joint ventures, strategic alliances, business groups, franchises, and relational contracts (Podolny and Page 1998). That is, we see two types of networks, the fragile and easily replaced (service worker), and the stronger, more permanently bonded (specialist). With the growing complexity of goods and service provision, the concern for quality and the necessity to reduce exposure to risks has made traditional market relations (accepting the lowest bids to ensure cost minimization) problematic. These concerns have led to a widespread preference for transacting with trusted individuals and forming strategic alliances with firms of known reputation. That is, we are seeing the development of this expanded community of users, operating as a multi-levelled network of associations.

The changes noted above have affected the core public service workforce. In addition to downsizing the permanent Public Service workforce (see also Sulzner 1998), the composition of this declining workforce has also changed. Since 1991, there has been a decreasing proportion of the Federal Public sector employees involved in Clerical, Operational, and Technical occupational categories and an increasing proportion of Scientific and Professional, as well as Administrative, and Executive personnel. In 1991, Clerical, Operational, and Technical workers accounted for almost 60% of the workforce and now only account for only about 47% of the workforce. At the same time, personal and financial administration is being decentralized to empower managers by granting them more autonomy and flexibility of management with regard to budgets and staffing. These changes have created an 'enterprise culture' espousing a new 'flexible management' approach to organizational governance which is very much in line with the shift to agile production.

#### **4. CONCLUSION**

We need to contextualize the changes that are reshaping the way work is done and services are provided. One way of accounting for these changes is to rely on the notion that we are moving increasingly to a society of risk and security. Coupled with the growing diversity of the consumer society, systems of mass production has given way to the necessity to rapidly respond to the demands of the consumers of products, data, information, and knowledge. At the same time, this increases the exposure to uncertainties, some of which are the product of the modern forms of (Taylorist) productions themselves (Beck 2000, Bauman 2000). The movement to a knowledge economy now seems predicated on the mitigation of risk, on the need to have every policy initiative supported by a risk assessment. Risks are

future-events; they are potentialities that are transformed into possibilities and probabilities by knowledge workers who research the events that have not happened yet – virtual events. More and more the function of government is security, securing the here and now requires the transformation of data into information, but governing the future requires the transformation of data into knowledge. Traditional information systems were organized around preventing the repetition of an event that had happened. The movement to risk is a movement from reactive policies to proactive policies, which is to prevent an event that hasn't happened from happening. In this, the state finds a new role as broker of information, but also needs knowledge capital for regulatory purposes. In as much as it relies on coded knowledge and the technical skill to store and restore abstract bits of data from its various matrices, the state also relies on the important mediating tacit knowledge and experience of its knowledge workers and their virtual teams, to transform information into policy, planning, and regulatory procedures, many of which are outsourced to the private or emerging arm's-length sectors, and to oversee the security of the relations with actors and organizations in these sectors.

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