

**Knowledge Management
The New Challenge for Firms & Organizations**

A Rapporteurs' Report
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Prepared by the

Innovation Systems Research Network (ISRN)

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Preface and Acknowledgements

This brief report summarizes some of the major observations offered at an OECD High-Level Forum organised by the Centre for Educational Research and Innovation (CERI) and held in Ottawa, Canada on September 21 and 22, 2000. The local hosts and co-sponsors included Statistics Canada, the National Research Council, Human Resources Development Canada, Industry Canada, Health Canada, the Department of National Defence, the Social Sciences and Humanities Research Council of Canada, and Treasury Board Secretariat. The participants and observers included scholars, executives, policy analysts and public service managers. Approximately 80 individuals were in attendance. The actual list of presenters and chairpersons is presented in Appendix 1, as is the actual agenda for the Forum. In preparing this rapporteurs' report, the assistance of Dr. Fred Gault is gratefully acknowledged. Moreover, the Forum itself would not have happened at all without the excellent coordination work of Louise Earl and the technical support of Jean-Denis Lajoie, both of Statistics Canada.

About the Innovation System Research Network (ISRN)

The Innovation Systems Research Network is a national network of scholars engaged in research on the dynamics of innovation, local and regional systems of innovation, innovation policy and measurement. Their work to date is presented in a number of books, including *Local and Regional Systems of Innovation* (Kluwer, Boston, 1997), *Information, Innovation and Impacts* (Kluwer, Boston, 1999), *Innovation, Institutions and Territory: Regional Innovation Systems in Canada* (School of Policy Studies, Queen's University by McGill-Queen's University Press, Montreal, 2000), and *The Economic and Social Dynamics of Biotechnology* (Kluwer, Boston, 2000). The ISRN is anchored around 5 'hubs' in Vancouver, Toronto (national secretariat), Ottawa, Quebec City (Saint Foy) and Fredericton and involves a wide number of international scholars from Europe and the United States as well as business managers, executives and civil servants.

Introduction

With the rise of the service sector, the growing importance of theoretical (R&D based) knowledge, and the driving importance of technological change, knowledge is increasingly seen – along with capital and labour – as a key factor in productivity, competitiveness, employment and economic growth.¹ It is also seen as providing important challenges to the management and analysis of innovative organizations.

This in itself is not a revolutionary insight in that, even as long ago as in Adam Smith's *Wealth of Nations* (1776), the theory of the division of labour was essentially an economic and organizational theory of knowledge. (see for example Brian Loasby, *Knowledge, Institutions & Evolution in Economics* Routledge, 1999)

However, knowledge is not a usual commodity. It is largely a public good. Unlike physical resources, it can be used and re-used without losing value. Its intellectual property can be transferred without losing ownership. Uncertainty is high in its production (i.e. research), but this drops rapidly as it is diffused. There is considerable social leakage in the transmission of knowledge. There are also considerable spillover effects which result in secondary benefits of proximity to the source of knowledge production, such as the development of high technology clusters, the attraction and retention of skilled workers, the attraction of investment, and the spinning out of new firms, jobs and industries. Markets – traditionally conceived – handle physical commodities well, but they do not handle 'non-commodities' (knowledge and information) well. Moreover, while the world of Alfred Marshall in the 1880s was based on bulk production and diminishing returns on investment, today's world features customization and niche production in which there are increasing returns.

¹ In economic growth theory and accounting, this reflects a move of knowledge and technology from being exogenous to endogenous. See the growth theories of Robert Solow (1957) as opposed to Paul Samuelson (1938).

These important characteristics are telling. But, even though the economics of knowledge and information is an area in which there is still a serious dearth of language, conceptual schemes and empirical research, the management of knowledge equally provides a paucity of comparative signposts and experience. Yet there is no shortage of questions or issues.

At the general level, we know that by focusing our attention on knowledge, not only are we focusing on the core asset of an organization but – analytically – we are becoming focally concerned with innovation, learning, competence, as well as with the production – identification – appropriation – application and diffusion of knowledge.

Session 1: The Knowledge-based economy and knowledge management

More particularly, we can attempt to identify – as the OECD High-Level OECD Forum did in Session 1 – the general trends in the emerging knowledge-based economy, which set the framework for knowledge management in organisations and firms. This involved posing a series of key issues, such as:

- Can we identify those generic trends in the knowledge-based economy that define the knowledge environment in which organisations and firms have to operate? What are the opportunities and the threats for firms and organisations learning to work in a “knowledge environment economy”?
- The competitive advantage of firms will even more rely on their ability to apply new knowledge to new products and processes. However, knowledge (tacit) is often embedded in firms and persons and cannot easily be transferred to other firms or organisations. Are we moving towards global markets for knowledge as we have global markets for information and products?
- Who are the key players working in the emerging global market for knowledge and what are their specific roles?

- What are the characteristics of the new knowledge workers?

Using Mode 1 and Mode 2 Knowledge Production

To approach these preliminary questions, the Forum began by linking the knowledge-based economy with knowledge management, from the macro to the micro.

Remember that, as suggested above, knowledge grows when you share it. However, in traditional economic and management thinking, 'sharing' means a loss in value and utility. This is not the case in knowledge-intensive activities. Clearly, more needs to be understood about knowledge production and knowledge management.

However, a serious problem currently is that dominant terms – like science, research, and curiosity-based investigations, etc. – have us stuck or limited analytically. It is partly for this reason that Dr. Michael Gibbons and his colleagues have coined the phrase 'the new production of knowledge' as a way to think about knowledge management issues in the new context. We need to begin to think outside the box.

In talking about the new production of knowledge, the distinction is made between 'Mode 1' and 'Mode 2'. In Mode 1, which is very much historically conditioned, the prominent units of analysis include disciplines, the individual researcher, and research sites that are hermetically sealed – such as the firm and the university. In this early image, firms are as described by neo-classical economics, in which technology and technical change are seen as an exogenous factor, equally available across space, and best practices are openly available to all rational actors using prices as a clearing mechanism. Firms would typically not carry out in house research except when it was central to the core mission of the organization. Thus, curiosity-driven research would 'naturally' be the domain of the university. In Mode 1, there was a clear schism between

utilitarian and non-utilitarian research. This antiquated conceptual framework led us to thinking about who would deal with what problems, how we would address these problems, and so on. This may have been appropriate at the time, but it is no longer. It arose in a time when every actor or institution knew the exact nature of their mission – universities, bureaux of statistics, etc. However this no longer, even remotely, reflects the reality of partnerships, science-technology interactions, networks, and the like. Yet, it is still in place (some think), especially in universities. Mode 1 is appropriate to a society where the roles of social institutions are static and clear. In a Mode 2 society, however, everything is fluid and dynamic. The rules are about change and adjustment.

In Mode 2 knowledge production, the idea is that today's issues no longer exist within the disciplinary structure. Research is carried out in the context of application (this does not mean 'applied research'), it is trans-disciplinary (which leads teams of researchers into a flexible set of approaches), it takes place in flat and networked organizations. Mode 2 therefore implies a difference in values. It means a change in research practices.

Clearly there is an organizational tension between Modes 1 and 2. There might be a new way of organizing our knowledge in universities, at a time when changes in context are evident. Today the production of knowledge is socially distributed. It is mobile. No organization has – or can afford to have – all the knowledge that it needs. The number of places where recognizably excellent research is carried on is multiplying. As such, the rate of growth of knowledge has been sharp, the use of knowledge in the global economy has been evident, and our ability to deal rapidly and flexibly, through networks and partnerships, allows us to deal with growing complexity.

To grasp this context is to set the theme of knowledge management. Thus the key issue is “how do you manage a socially distributed knowledge production system? How do you optimize it?”

This issue is not, however, about the difference between codified and tacit knowledge. The needed emphasis is a shift from knowledge articulation to knowledge configuration.

For example, within the innovative process, there are 2 levels of competition: competition between existing products in which considerations lie in considering how to expand operations using existing technological choices. (This is what industrial economics talks about – prices, etc.). A second level of competition lies in the choice of technological configurations. In this process, there are a number of technological choices on offer. Competition at this second level involves a competition over the strength of a firm’s ability to join the right technological ‘groups’. (We can think here about the choice between two fundamentally different ways of dealing with magnetic sound – Betamax versus VHS). In this process of selection, we are dealing, *au fond*, with matters of human resources, human resource management and human resourcefulness. These second level choices determine the firm’s future 20-30 years hence. Level 2 competition is a Mode 2 issue.

Out of this we face a serious problem. This kind of configuration process is spread throughout our society and represents a shift from stocks to flows, from the type of people you need (we need to be training identifiers, solvers, and knowledge brokers, as well as producers). With regards to ‘identifiers’, the hardest thing to do is to find or define the problem. With regards to ‘solvers’, you need teams and networks – not an individual with a doctorate in a discipline. With regards to ‘brokers’, you need holders and gatekeepers.

We are all living in a time where there are 4 related factors: (i) complexity; (ii) complexity generates uncertainty; (iii) uncertainty leads to experimentation; (iv) experimentation results in institutional permeability and thence again to the generation of complexity. Seen in this way, it should be clear that the question of knowledge management is not about codified versus tacit knowledge.

The Interplay between Firm Strategies, Innovation and National Systems of Competence Building²

At the core of knowledge management is a concern with transmission problems. As the previous section has suggested, by shifting from stocks to flows (in which dynamic terms such as 'learning' and 'innovation' become central), not only are we able to move beyond traditional economic and policy frameworks but we can focus on 'learning by doing' type activities not just in high technology or knowledge intensive industries but in the low and medium technology industries as well. Thus, an emergent knowledge management approach is more inclusive analytically.

But to approach this potential for understanding the new context for knowledge production and knowledge management, we must take centrally into account the specificity of the context – the local and regional systems of innovation, the availability of labour, capital, and infrastructure, the institutional structure and histories and so on. In this, and harkening back to our opening comments about the framing power of language, it is popular to refer to 'Best Practice'. But this is, at best, a concept. 'Good practice' would be better.

This is important because, again, of the tension between Mode 1 and Mode 2 knowledge production. Distinctions are key. In traditional economic frameworks, information and knowledge are treated as equivalents. But this sort of assumption breaks down when one has too much information. It

² These notes are based on the presentations made by Professors Lundvall and Lam.

takes skills to select, interpret and use new knowledge and information. But of course, skills are partly tacit. At the individual level, artisans, scientists and managers can all make high wages based on their knowledge. Their knowledge can be a combination of experience-based or learning-based (i.e. through listening and reading). But as we move up towards the more aggregated, organizational, level, we need social capital to mobilize different types of knowledge around an innovative organization, locale, region or industrial cluster.

This sort of observation is important because a 'learning economy' reflects an awareness both of the importance of knowledge as a factor of production and of the acceleration of change. This implies shorter production life cycles as well as shorter competence life cycles. This latter observation connotes the need for a shift – not only from stocks to flows but – towards learning, training, and the capacity to absorb knowledge.

In some ways, understanding knowledge in a social context requires a preliminary taxonomy that both illustrates the learning capability of firms and links it with the patterns of learning. On the explicit level, knowledge is 'embrained' in the individual and 'encoded' at the collective level. On the tacit level, knowledge is 'embodied' in the individual and 'embedded' at the collective level. On the organizational level, the standardization of knowledge and work can be connoted by professionalism and by bureaucracy. On the organizational level, the machine can signify learning. Each suggests differences in learning patterns, capabilities, types, mobility, stability, and so on. Each differs in its need to be supported by, or have access to, regional networks. Cultural norms effect the 'diffusability' of learning and knowledge.

These levels or types of knowledge and learning lead to institutional configurations, differing from highly explicit to highly tacit which, in turn, affect the mobilization of skills, credentials, and the facilitation of

organizational learning. These variously affect the ability of a region to develop and retain learning institutions, as in Silicon Valley, or firms. These also affect a range of innovative capabilities, from the incremental to the radical. Each differently fosters cohesion and trust.

In sum, can we identify those generic trends in the knowledge-based economy that define the knowledge environment in which organizations and firms have to operate? What are the opportunities and the threats for firms and organizations learning to work in a 'knowledge environment economy'?

We see a general trend towards flat organizations, cross-disciplinarity, flexibility, networks and partnerships, and sharing. We see new ways of analyzing trends that highlight the limits of traditional conceptual and empirical approaches, and move towards flows and dynamics. We see expanding sources of knowledge and dramatically changing roles of institutions. We know that knowledge exists in people and people move. Moreover, knowledge 'happens' *in situ* (between the worker and the work – learning by doing). Codification is extremely limited as a process and as a goal, as are taxonomies (although these are needed if knowledge flows, intensity, etc. are to be measured).

The competitive advantage of firms will ever more rely on their ability to apply new knowledge to new products, processes and organizational forms. However, the knowledge that is embedded in firms and in persons cannot be easily transferred to other firms and organizations. New knowledge workers must increasingly feature flexibility, adaptability, team play, issue-based versus discipline or hierarchy based structures, mobility, and configurative awareness.

Session 2: Knowledge management strategies³

Beneath the level of the macro concepts discussed above exist the day-to-day issues of knowledge management – how firms and organizations concretely manage their knowledge assets and how it varies across sectors. What works and what does not? Backing up these broad questions are some key issues, such as:

- What kind of new resources and competencies do firms and organizations have to create in order to succeed in the knowledge-based economy?
- The management of competencies within firms and organizations: identifying and supporting learning processes; establishing networks; implementing linkages and feedback.
- The management of external relations: how to identify and absorb relevant external knowledge?
- What are the difficulties faced by the organization or firm in order to build up a collective competence or organizational capabilities?
- How can new technology and software help companies to have more efficient practices of knowledge management?
- What are the cost issues and incentives for developing knowledge of individuals and promoting learning organizations?
- Can we identify a framework for how different knowledge management strategies differ in firms and organizations according to for example their age, size, technology, sector, competitive environment, and national culture?

Based on the investigation of some two hundred and thirty knowledge-based projects in a well known multinational firm which operates in the

³ This section is based on remarks offered by Larry Prusak, Dominique Foray, Göran Carstedt, Kazue Kikawada and Stephen Denning.

information, computation and communication technology areas, we can begin to estimate why nearly fifty per cent of these projects failed.

Some success factors can be enumerated as follows:

- (1) Connectivity: Projects that succeed are good at connectivity. The factor behind successful connectivity is not technology. People self-organize, in a non-hierarchical way. Organizations must create conditions for people to self-organize.
- (2) Visibility: It is easier to manage information than to manage knowledge. But knowledge can be made visible. Visibility reduces transaction costs of finding people in organizations. Databases and expert systems were not helpful either. Organizations should give visibility to groups. Creativity lies with groups, not individuals.
- (3) Localism: Knowledge is created locally in the interaction between people within organizations. Lots of knowledge is tacit, unarticulated, uncodified. Also, local practices are many times very valuable and can be articulated and adapted. Technology and bureaucracy may stiffen local knowledge and tacit knowledge. Storytelling is part of this type of knowledge.
- (4) Time and space: One has to devote time in order to learn. Human beings have to learn in order to become creative. Space is needed to put people together interacting.
- (5) Reward positive behavior: Reward people who share knowledge.
- (6) Trust: Trust allows organizations to reduce monitoring and share knowledge.

From this, we can identify dominant patterns in knowledge management practices. Companies employ knowledge management practices companies to solve problems. There are sectoral patterns and there are patterns related to the size of the firm. We can conclude that (i) it is possible to qualify knowledge management practices and to identify them; (ii) good strategies are strategies that are consistent with the organization strategy and structure.

But why do we need knowledge management strategies? Knowledge is largely tacit. It is costly to express, identify, or codify. It is exactly because knowledge that is new to us is largely tacit we need to have knowledge management practices. We need codification strategies. Codification makes it easier for others to use. We need organizationally personalized strategies, in order to be sure that people and firms adopt new knowledge. Thus we must analytically attend to corporate culture.

Most companies use a strategy, either via codification or via absorption. These will shift over time. Both strategies are equally expensive.

To some, the key lies in the capturing of emerging, tacit knowledge. But knowledge producers and consumers are often the same people. But there are limits to personal networks, and there is an extreme limit to knowledge codification because of the acceleration of change. To balance between strategy types, transparency, trust and visibility are key. Indeed, some projects fail because people sometimes believe that technology alone can solve the problems.

Knowledge Management is not about technology, but is about managing people and helping them to deploy their knowledge towards solving problems for the firm or organization. Thus, as in the case of IKEA, each employee needs to think that he or she is part of a bigger context. People have to feel that their knowledge will be used. Organizational purpose

needs to be clarified in order for people to be active. In the firm, four constituencies need always to be emphasized: customers, the employer, the public, and the variety of stakeholders. To this end, employees have to share values. Thus IKEA tries to merge the company philosophy with Swedish values and North American values and uses.

IKEA produces manuals (a codification strategy in itself) but also tries to operate as a learning organization and continuously improve and update those manuals. Otherwise it would become a rigid, inflexible organization. The world changes. Change is about learning, re-conceiving and re-framing. Management is fundamentally not just about applying knowledge but it is about learning. Learning is obtained through experimentation, search, and mistakes. But traditional approaches to management do not typically reward these features.

Therefore at a deep level, the new or emergent paradigm is about:

- innovation;
- collective learning;
- collective learning through individual talent;
- attracting and retaining talent;
- the leader as a 'servant facilitator';
- building trust and relationships
- knowledge dissemination through networking, alliances, and joint research;
- reaching beyond 'the Corporation';
- moving from confrontation to cooperation.
- interactive collective learning, cooperation, and improved avenues towards a better quality of life.
- evaluating and selecting knowledge.
- storing and distributing knowledge, through databases, knowledge managers, gatekeepers and events.

Another company that has worked hard to implement a knowledge management strategy is Fuji Xerox in Japan. From their perspective knowledge management involves a mutual interaction that encourages a sympathetic dialogue among people in an organization. To manage knowledge effectively the firm must foster an environment that facilitates the creation and utilization of knowledge. One concept that Fuji Xerox has effectively used in pursuing this goal is Nonaka's concept of 'ba'. "Ba' is defined as a shared context in which knowledge is shared, created and utilized".⁴ 'Ba' involves more than just a physical space; it encompasses both a specific time and a space where knowledge can be dynamically created through the interactions among individuals and/or their environments. To promote this kind of interaction, Fuji Xerox has created various 'ba' within the firm to facilitate knowledge-based interactions among the members of the firm transcending the boundaries of different sections or units of the company. A key element of this practice involves interdisciplinary networking based on mutual trust with people in different fields aimed at encouraging individuals to innovate.

Other organizations, including those in the public and not-for-profit sector, face similar challenges in breaking down internal barriers to encourage knowledge sharing and the dissemination of ideas. In some measure, this challenge stems from the gap between the image of organizations presented in most textbook versions and the reality of how organizations actually operate. In the textbook version, organizations are well-greased machines in which everyone understands the objectives of the organizations and anxiety is low. In reality, many of its members often feel as if the organization is falling apart, they are unsure of what is going on in the organization and the organizational structures often conflict with the mission of the organization. The more effective management of knowledge within the organization can play a critical role in narrowing this gap.

⁴ I. Nonaka, R. Toyama and A. Nagata, "A Firm as a Knowledge-creating Entity: A New Perspective on the Theory of the Firm," *Industrial and Corporate Change* 9, 1, 2000: 8.

The recent experience at the World Bank sheds some light on how this can be accomplished. At its 1996 Annual Meeting, the World Bank announced that its intention to share its knowledge base with its customers. In September 1998, the Asian financial crisis put pressure on this intention with respect to knowledge management. A case in Pakistan pointed the way to how the World Bank could be helpful in assisting customers using knowledge produced in other countries. A locale officer with a technical problem to solve within 48 hours found another manager in a remote location who had previously had to deal with the same situation. By drawing on the experience buried within the organizational network, the local officer helped solve the problem faced by his clients. Similarly, recounting the success of this story to other parts of the organization and higher management helped point the way towards the World Bank's more effective use of knowledge sharing instead of knowledge management.

The lesson from this example is that story telling can be an effective mechanism for encouraging organizations to manage their knowledge base through information sharing. Storytelling can spark the idea and the initiative for organizations to share information. These stories have to include values and narratives. For stories to be communicated effectively, the speaker has to imagine what the listener has in mind. Storytelling is highly collaborative – listeners fill in the gaps and they re-construct the story. There are a number of key criteria of effective storytelling:

- the story has to be understandable;
- the story has to be told from the perspective of a single protagonist;
- the story has to have a degree of strangeness;
- the story has to have a happy end;
- the storyteller has to believe it;
- the story is not the panacea: it takes the listener into the idea.

But how does one reconcile transparency and confidentiality within an organization? This issue can be illuminated by examining the recent experience of, and challenges facing, the educational sector.

Session 3: Knowledge management in education⁵

A recent OECD report indicated that most educational institutions pay little attention to knowledge management and many cannot realistically be described as learning organizations. The pressure on educational institutions in this regard will likely increase with the new possibilities for using information technologies to deliver education services in a number of innovative ways. This challenge raises several key issues that were addressed at the Forum.

Specifically

- In what ways might preparation for the world of work in educational institutions need to change?
- How will the characteristics of the new knowledge workers affect the curriculum, the culture and the outcomes of educational institutions?
- How might the relations between business and education be changed in a knowledge economy?
- How will the knowledge economy affect the leadership and management of educational institutions?

In response to these issues, and as was suggested at the outset, the new production of knowledge requires universities to be stable, but adaptable. The technological environment of the university has changed. Given that the rise of the university in Western European history is concomitant with the rise of modern science, some of the contemporary dilemmas of the university are related to the deep problems of science funding. As we move from thinking of 'knowledge' instead of 'science', expectations change and universities begin to perform different roles. Universities have long been proud of their autonomy, but it has come at a price. The new

⁵ These observations are drawn from comments provided by Sir David Watson, Dale Shuttleworth, Heather Munroe-Blum and Hans Schuetze

compact between universities and the state pivots on the essential tension of the desire to retain their independence, while simultaneously responding to the state's goal of assuring greater accountability.

The management of knowledge within post-secondary educational institutions is – at the moment – inseparable from the power relationships within universities. These power relations are paradoxical: research team leaders work within organizational structures that are essentially flat. As such, university leaders have to walk a difficult line between protecting the institution's role and involving all members of the research community. An equally difficult challenge involves the increasing intertwining of the universities as public institutions with private sector activities. As the boundary between public and private sectors blurs, it is apparent that universities belong to neither camp and are an example of what can be called social businesses – organizations that deliver a service of benefit to the community by operating in a business-like fashion. The role of universities is increasingly to deliver more directly both on public policies objectives as more money directed to them is tied to specific public policy goals and on private sector goals (funded by contract research). Universities have begun to move beyond sustaining 'wet knowledge' and becoming a 'hypertext organization'.

One taxonomic way through which to marshal knowledge management in the university sector is to look at

- domains of activity about how individual universities balance their activities across range of activity;
- outcomes as they affect students - issues of employability, but also issues of lifelong learning rising in importance - number of students not registered in their first time degree is rising rapidly
- patterns of influence - in some areas levels of teaching and research are intertwined

- reputational positioning - local regional and international scales
- who pays, how and in return for what - tied funding raises questions of institutional autonomy
- cultures - institutions cannot escape their history - best leadership is often by stealth

Universities at their best are 'learning organizations', but how can this potential be effectively realized, given that the mixture of technological, social and political circumstances has reduced both the isolation of the university and its capacity for genuinely independent action.

Somewhat different, but equally challenging problems exist within the management of elementary and secondary schools as well. To be sure, there is a sense of crisis amongst school managers in that the role of school administrators has changed dramatically, given that they are responsible for administrative financial, managerial and human resource tasks. In the context of widespread decentralization and deregulation, this has had a profound impact on school managers. Teachers, trainers and professors, too, are suffering from increased pressures, low job satisfaction and low self-esteem. Thus, the massive educational system that was developed in the 20th century on the principles of the industrial economy is struggling to cope with the shift to a radically different knowledge-based economy. Underlining this is the fact that there is a changing set of skill requirements for 'the new age'. This involves a shift to soft skills, team skills, and problem solving skills. How can institutions that were designed to meet the needs of the industrial age respond to the demands and challenges of the 'Knowledge Age'? Clearly, many countries feel this requires new initiatives in order to adjust.

In The Netherlands, for example, the government has introduced the right of choice. They have established standards nationally, but it is the schools

at the local level that are held accountable. There is a similar move in Hungary and this in some ways resembles the charter schools in the U.S. Also, self-evaluation techniques have been tried in several places, including Greek and Mexican schools. Performance testing is another initiative that is being put in place, for example, in Ontario, Canada, as is merit pay.

In the end, the new economic age expects educational administrators to be knowledge managers able to inspire teachers and students to be self-renewing learners, in a learning organization, but this role conflicts with the older one of an industrial-age supervisor of quality control standards. In the current context, the challenge is to find the strong, inspirational school administrators and teachers who will span the emerging divide between the old industrial age and the infinite flexibility of the new learner-focused, post-industrial society.

Universities, as was observed above, play a primary role in knowledge generation and knowledge management in the global knowledge society. There is a strong correspondence between the quality of universities and university research and the economic productivity of a region. As important as universities are in the knowledge economy, however, they cannot 'do it all'. In the production of new graduates and new knowledge they are central. In the diffusion of knowledge, they also have an important – though not a solo – role. They can do this by working across disciplines and with partners across a wide range of sectors. Social and political expectations of the role of universities are critical – if you try to micro-manage a learning environment, it is widely felt that inevitably you will get it wrong. The use of performance indicators, for instance, must be selected with extreme care. This is not to suggest a return to the Republic of Science prescribed at mid-century by Michael Polanyi and John R. Baker⁶,

⁶ See for example Michael Polanyi, "The Republic of Science", *Minerva*, 1, 1, 1962

but is to argue for an intimate understanding of the innovation process, complete with the constituent roles of creativity and entrepreneurship.

In this motif of partnerships, proximity remains critical; education and learning, as well as knowledge production and dissemination, is a contact sport. As such, face-to-face contact is a pre-requisite for effective knowledge use and management. One cannot make effective use of new information technologies such as video conferencing unless people know each other well. This observation harkens back to the importance of creating international virtual networks of scholars, federal and provincial centres of excellence, and so on.

Universities are sometimes looked to as providers of a silver bullet for local economic development and innovation, but they constitute just one part of a complex system of local and regional innovation. There has been much emphasis on the transfer and commercialization of university research, knowledge and technology; indeed the primary product universities contribute to the knowledge society is their graduates. The post-secondary education sector is an essential factor in a changing social and economic environment where knowledge and talent have fast replaced financial capital as the primary asset, but there is no guarantee that every research-intensive will automatically play this role. The State of Massachusetts lacked a state strategy for deploying the knowledge assets of its university research base during the 1980s recession. This, as analysts like AnnaLee Saxenian have shown, helps to explain the dramatic erosion of competitiveness at Harvard and MIT. Only subsequently did the State put in place a more comprehensive strategy to enhance the strength of its major research universities and contribute to diversifying the industrial base of the state economy.

To move beyond, or rather to expand, these observations about knowledge management and flows involving post-secondary education

sector, we can look to some comparisons of way that knowledge is transferred from between university and industry and vice versa.

For example, Europeans often complain that they expend a high level of funding on R&D, yet the U.S. is much more successful in commercializing research. What is the explanation for this European paradox? A quick tour of the issues shows that there are significant gaps in Cupertino between industry and universities, in part for legal reasons, in part because of the social status of university professors in Europe, and in part for the cultural norms and views of civil servants. Recent policies have aimed at making European universities more flexible; but the linear model of innovation is still implicit in many technology transfer policies – a model, which as Nathan Rosenberg says, is dead but won't lie down. Given our current appreciation of the complexity of structures, institutions and knowledge flows in the innovation process, it is not surprising to find that such policies have not met the expectations of their designers.

Also in Europe no traditions and few structures are in place to permit researchers to engage in collective learning with researchers and to allow them to manage fragmented sources of knowledge that come from different disciplines. This lack of flexibility and managerial capabilities, in contrast with North American schools is damaging in that Continental universities still largely believe in organizations characterized by the single Chair or University Professor, whereas in North America we find that departmental structures are dominant. Such cultural differences militate against doing multi-disciplinary work. It also impinges on the way in which students are taught. This can be seen in the way undergraduate and graduate work is organized in Canada and the United States, as opposed to the more singular structure found in Europe, especially Germany, where the integration of teaching and research has been all but lost.

Appreciating the cultural specificities of national contexts when making comparisons is analytically critical. But notwithstanding this, recognizing that universities can drive change in their communities if it is of very high quality and if it offers real value is an important first step to instigating meaningful organizational change. Beyond this however, one cannot address universities, inter-sectoral flows and knowledge management/production without considering intellectual property rights.

Session 4: Knowledge management, commercialization and intellectual property rights⁷

To approach the issues surrounding commercialization and intellectual property rights, the Forum focused on three sets of issues, namely:

- Why should an effective IP organizational strategy require knowledge management capacities? What is the importance of interactions between IP management and knowledge management? And how can we find a balance between the protection of ideas and the circulation of ideas?
- What are the IP issues regarding knowledge transfer between private firms and universities?
- How can we manage our knowledge on the WWW (e.g. 'digital rights')?

In order to address some of these questions, one might profit from briefly examining the effect of the Bayh-Dole Act in the United States on university patenting and licensing patterns, with attention to the cases of the University of California, Stanford and Columbia University.

By way of background, recall that the Bayh-Dole Act was passed in 1980 to encourage the transfer and licensing of federally funded university

⁷ This section is based largely on comments offered by David Mowery.

research. As an indicator of success, note that the number of patents increased dramatically from 177 in 1974 to 1,486 in 1994. This increase closely mirrors the implementation of the Act, thus some form of causality can be inferred, although – as noted above – the context of the New Economy played an important role as well. During this period life forms became patentable, biomedical academic research funding increased considerably, and the war on cancer fostered research in molecular biology. All ‘conspired’ to increase patenting of federally funded and university performed research. During this period, biomedical activities clearly dominate in terms of number of patents and revenues from patents at the University of California, Columbia and Stanford University. Moreover, in all three cases, revenue from patents was dominated by a small number of patents.

But what can we say about patenting before and after Bayh-Dole? University of California and Stanford University patents were more frequently and more broadly cited than non-academic patents, both before and after the Bayh-Dole Act. The Bayh-Dole Act increased the incentives for researchers to patent and thus increased the number of academic patenters. Less experienced universities took time to learn how to evaluate which of the disclosures were likely to yield significant revenues. Thus it can be said that the overall effect of the Bayh-Dole Act may have been to increase disclosure patenting, increase entrance in patenting, although – indirectly – the rapidly changing context in which technologies developed and knowledge was produced in the period since 1980 clearly played a role, as did – directly – the dramatic growth in the funding of biomedical research. As a learning curve evolves, the differences between entrants’ and incumbents’ patents may decline over time.

If we broaden our discussion beyond a case of intellectual property rights, we can look at the commercialization of university research with an eye to Canada and in terms outlined above viz. a viz. the linkages between

policies, strategies and actors.⁸ For example, it is important that a strategic approach to innovation play a key role in the productivity agenda. Such an approach should consider four aspects:

1. Knowledge Infrastructure.
2. The Commercialization of Knowledge.
3. Human Resources.
4. Business environment.

The Government in Canada has invested heavily in university research. But from 1991 to 1998, the licensing income of universities increased at a faster rate in the U.S. than in Canada. Four main barriers prevent Canada from achieving its full potential regarding the commercialization of Canadian university research:

1. Government policy.
2. Lack of university resources to identify, protect and market IP to the private sector.
3. Shortage of people with the skills to bridge the research and business communities.
4. Insufficient accountability.

To overcome these problems, we need to clarify policy objectives and linkages. We need to modify capital gains and stock option tax treatments. And researchers must disclose federally funded IP that they commercialize to their university.

Within the context of the foregoing, a number of issues emerge. For example, beyond the need for caution in carrying out comparative analyses (as between the US and Canadian university systems), universities need to find the people with the know-how to assess the

⁸ These comments were offered by Pierre Fortier.

potential yield of research considered for patenting. A more sophisticated framework is needed to assess the benefits that can be derived from the commercialization of university research. The costs, as well as the benefits and the appropriateness, of patenting must be carefully assessed. All of these issues impinge on the examination of knowledge management.

Session 5: Good practices of knowledge management in firms and organizations⁹

As was mentioned earlier, the popular idea of 'best practice' needs to be replaced with the idea of 'good practice'. With this in mind, the Forum posed two broad sets of issues:

- What are the existing work and criteria for identifying good practices of knowledge management – for example, through learning by comparing or benchmarking? Can they be applied across firms and organizations and sectors within both private and public services and administration?
- How would this framework or set of criteria determine good practices according to age, size, technology, sector, competitive environment, national culture, and so on?

Within firms and organizations, managers ask the twin questions “what are we doing well?” and “where do we need work?” To address the first, we must examine three key resources: people, processes and portals.

In terms of the ‘people issue’, we are generally making progress in “talent management”. This is because ‘talent’ is now being recognized as a valuable resource to firms. Social networks are being encouraged; knowledge professionals are now well established within organizations. And there is a growing understanding that we need to foster “knowledge amateurs” – i.e. people who develop day-to-day knowledge management skills amongst knowledge workers throughout the organization

⁹ These comments were offered by Tom Davenport.

On process, we are weaker.

On portals (technology) more progress is needed, despite our recent achievements.

Generally speaking, good knowledge strategies are still relatively rare in firms and organizations. On such issues as knowledge quality, knowledge structure and content accessibility within organizations, we have made some progress, but clearly we are still in the early days.

On the latter question, we can note that many organizations are now creating knowledge professionals. But market research has shown that strategic planning is not being well integrated into knowledge management. Firms and organizations are beginning to evaluate their overall 'talent portfolio', but there are other key questions to ask such as 'how much division of knowledge labour do we have? (there are still only a few organizations in which it is *everyone's* job to produce and apply knowledge)'; 'how much time do we spend learning and gathering knowledge versus doing or applying knowledge?' and 'do we need to hire 'knowledge-seekers' whose job it is to learn their entire careers in the first place?'. Many firms are now recognizing that human *attention* is an extremely scarce and finite resource. Therefore, unlike data volume, network bandwidth, and other technical limits, this may turn out to be the chief constraint for organizations and individuals.

But a key question that logically flows from this observation might be 'How might we *manage attention*?' A few points can be made in this regard.

By focusing on 'attention' we may have opened a 'new lens' on the business of knowledge management. The components of attention might include the use of technology to capture attention; the evolutionary biology

of human attention; the media attention span industries (as in film, TV, and advertising), etc.

For knowledge managers, attention is more important than simple access. Take the example of e-commerce in which there are now more than two billion websites in existence competing for our attention.

In terms of portals, technologies are now widely used (such as e-mail, Lotus notes, etc.). Thus access is not the issue anymore. The real need now is for better methods for structuring and integrating knowledge.

Of course it is important to measure knowledge management processes. On the one hand it is relatively easy to measure the number of database 'hits', and so on, but capturing knowledge on the balance sheet is extremely difficult and there seems to be little interest on the part of firms and managers in measuring work knowledge/processes. At a time in which we are spending \$1.5 trillion/year on information technology, perhaps it is time for more expenditure on knowledge management and measurement.

One organization that is attempting to design and implement a learning strategy is the National Research Council of Canada – a federal government research organization. At the NRC, they are "navigating by context" with the understanding that they are working in a context-rich environment.¹⁰

The NRC recognizes centrally that the capacity for effective knowledge-based action is a *group* dynamic. The Council is quickly evolving away *from* being just an R&D organization *towards* being centrally interested in innovation, knowledge management (creation and diffusion). Previously, the NRC was somewhat inward looking. Today, it is actively collaborating with outside partners and networks. In becoming deliberately knowledge-

¹⁰ These comments were offered by Jack Smith and Martin Brooks.

based, management has had to recognize that organizational adaptation and survival is not only a matter of recognizing the value of speed, intangible assets, relationships and connectivity in the creation of value, but it also depends on understanding how to 'act smarter'. Survival and competition require it. For the NRC to realize this new orientation, it has accepted that as production processes become disaggregated and socially organized, context is all-important. In order to assess how well an organization is adjusting to this new context, measurement and calibration are needed, but – again – some measures apply to organizations, some to networks; and still others to clusters. Measures should encompass external relationships and linkages as well as internal dynamics. Through a variety of efforts – with SMEs and schools, for example – and contexts – in language learning and music learning, for example – the NRC is trying to learn to transmit *tacit* knowledge more effectively. In so doing, the NRC is in effect trying to transform itself by looking at the process of knowledge management as a form of *self-organization*.

With these examples in hand, it is clear that there is a need to develop valid and reliable tools for measuring knowledge-based assets.¹¹ Some progress is being made in developing valid and reliable tools for measuring knowledge-based or intangible assets. Such assets, as should be clear by now, are embodied in individuals and in relationships.

One way to look at the task before us is to say that there are essentially three types of such assets: human capital, the external world of customers and relationships, and the internal world of the organization. Despite the difficulties or impossibilities of measuring knowledge directly, the goal of knowledge management is creating value by leveraging intangible assets. Three tools developed for the measurement of the knowledge management process are called the Intangible Balance Sheet (IBS), the Intangible Assets Monitor (IAM), and the Collaborative Climate Survey

¹¹ These comments were offered by Karl-Erik Sveiby.

(CCS). (For a full discussion of these, please visit: www.sveiby.com/OECD.zip)

An interesting question behind these approaches is 'Why would a company embark on knowledge management?' One compelling reason is that Nokia's stock exchange value is about \$190 Billion as compared to a visible equity of only \$5.7 Billion. Accountants call this difference 'goodwill'. 'Goodwill': has 3 essential components: individual competence (human capital); external structure (customer and supplier capital); and internal structure (structural capital). But are these really forms of capital? After all, when knowledge is shared between two people, it at least *doubles* whereas with traditional capital, when shared, it is *halved* or otherwise decreases considerably with use.

If one were to 'crack open' the blackbox of human capital, the external world of customers and relationships, and the internal world of the organization, one would find that customers, suppliers, stakeholders, and relationships occupy the external world; patents, brand names, systems, processes, culture, and administrative or staff competences populate the internal world; and competence, diversity, education, experience, skills, attitude, and energy describe the world of human capital. This sort of disaggregation is an essential first step in measuring the processes of knowledge management. It also allows the tracking of flows (stemming from efficiencies, innovation and growth, for example). It is critical to underline the reality that flows are more important than stocks in a knowledge-intensive world. Also, once a relevant disaggregation has been achieved, then numbers can be taken, weights can be applied, and indices can be created which subsequently can be graphed and interpreted over time. Such a process can thus be linked to a strategic plan in order to produce targets and measure progress.

Key in such an evaluation of flows is the need to *ask the right questions*. In adopting such an approach managers start asking *different* – i.e. knowledge relevant – questions).

What makes measuring knowledge directly so impossible is in part the fact that knowledge management is about *sharing* which, in turn, depends on *trust*. It is therefore important to be able to measure this as well.

In an attempt to approach this problem, a joint venture was formed between PricewaterhouseCoopers, LiquidSurveys and Sveiby Knowledge Associates to measure collaborative ‘climate’ at the corporate, departmental and workgroup levels. The purpose was to examine individuals’ perceptions of the prevalence or extensiveness of knowledge sharing. In sum (again, for more detail refer to the above noted web-site), the venture suggested that it is possible to link collaborative climates with monetary success.

In working with firms, in order to encourage them along the path of measuring knowledge processes with such tools, the ‘hard sells’ tended to hover around the need to rethink corporate strategy in order to focus on knowledge, the need to change attitudes so managers could measure for *learning* and not just for performance, and the need to be patient when implementing these measures. After all, such practices are more important than the final product (indicators).

Thus, in sum, while intangibles cannot directly appear on traditional balance sheets, we can use indicators to ‘peek inside’ these assets and to monitor their *flows*. We can potential use and develop new methods to increase the transparency of corporate practices and performance, but the art of measuring intangible assets is still very new. In measuring knowledge flows and processes, it is analytically important to be aware that sometimes, knowledge management practices might be implemented

by a firm solely as a public relations tool in order to convince the stock market or share holders that the firm is a 'knowledge-based organization'). But here again the *process* of asking the right questions should have managerial benefits as well as making any superficial maneuvers transparent.

Summation¹²

During the OECD High-Level Forum, there was discussion revolving around 'learning' – learning by people, by firms and by regions. There was also considerable discussion about 'tools' for learning, principally in the domain of information and communication technologies (ICTs). This is consistent with the assertion, made by Alan Greenspan in June 2000, that: "What differentiates this [nine year] period [of sustained growth] from other periods in our history is the extraordinary role played by information and communication technologies." This may add support to the broad view that we are indeed dealing with a 'New Economy', an economy that uses the infrastructure furnished by the ICTs to move, process, store and display information and codified knowledge as well as to support learning, and the creation and use of knowledge at a distance.

All of these resources can be applied to help business or public institutions to do better what they are doing now, while still protecting intellectual property rights. The application of learning, as well as the knowledge created to do things better, in a systematic way, using infrastructure tools, may be the significant characteristic of the 'New Economy'. Of course, the idea of using information and knowledge, supported by a technological infrastructure, to improve the functioning of an institution has been tried before. Management information systems represent one such attempt. An example in the public sector is the information and knowledge management system put in place by Stafford Beer for President Allende of

¹² These comments were offered by Fred Gault.

Chile some years ago. Had that system become operational, it would have been a laboratory for studying knowledge management in government.

The focus of managers is shifting away *from information*, which can overload and overwhelm people, *to knowledge*, which supports their actions. Canada has for years had a two dollar coin, on the back of which is depicted a polar bear. For the millennium, the coin had added to it the date, 2000, and the words, 'Knowledge' and 'Le Savoir' on either side of the centre. In the centre, there is no longer one bear, but three, a large bear and two small bears. The message may be that knowledge is a capacity for action.

To generate a capacity for action, there have to be problem solvers who produce new knowledge, and problem brokers able to assemble teams to address problems in need of solutions. The most difficult step, before any of this can happen, is finding the people able to identify problems, so that the brokers can assemble networks and the solvers can solve. A point touched upon at the Forum was that networks, and even hierarchies, are made of people and people work better with shared values, common visions, and the ability to continue to learn. Speakers reminded the Forum that there were barriers to learning, such as hunger, even in industrialized countries, for poor children trying to concentrate at school, and, for the more affluent, an impediment is the flood of demands for attention by the very communications infrastructure that is there to facilitate learning, problem solving, and the creation of productive knowledge.

Productive Knowledge and Sharing

At the Forum, there was much talk about knowledge management and little about knowledge. However the subject of the discourse appeared to be centred on 'productive knowledge' and productive knowledge, like other

kinds of knowledge, grows when it is shared. This raised the important question of how to share knowledge.

There appears to be two elements to sharing. There must be trust, and there must be a means of communication. The means put forward at the Forum was the 'story', and not just any story, but success stories told in such a way that the listener could identify and then tell his or her own story. A good story, like a cartoon, lets the listener or reader fill in the gaps and become engaged, a phenomenon recorded by the Canadian communications scholar, Marshall McLuhan in the 1960s. Once the person is captured by the medium, space and time no longer matter, and learning can start.

There were other ways of sharing knowledge discussed at the Forum, the Japanese concept of 'Ba', 'Holderspace', and chat rooms were all mentioned. To work well, there had to be a broadband infrastructure to support the sharing of image and sound. The point here was that it took more than twisted copper pairs, or even co-axial cable, to achieve the death of distance.

People, in face-to-face interaction are transferring vast amounts of information in the optical part of the electromagnetic spectrum, in addition to any audio exchange that may be taking place. This face-to-face encounter is necessary to the building of trust and the electronic infrastructure will not be a substitute for meeting in person until the transfer rate of information is higher than is now available to consumers. However, no amount of bandwidth will replace the corridor conversation, unless, of course, this freedom is built into new electronic conference systems.

For an organization to share knowledge rapidly and effectively, it helps if its structure is flat, open, interdisciplinary, and configured to focus on a problem. The activities that are needed to make this happen are not yet

well codified, or understood, or there would have been no need for the Forum. There was also a question of whether it was possible, or even desirable, to manage knowledge, leading to an observation that the fostering of a sharing environment was the fundamental activity which would lead to more productive knowledge and its application.

At the interface with the problem, knowledge is generated and it is also transmitted and used by other actors engaged in knowledge activities and linked together for a common purpose. The generation of knowledge everywhere, and especially at the interface with the problem, was a recurring observation at the Forum, which raised a question about the role of higher education.

Education

The potential for higher education in the New Economy is enormous and it is not just limited to engaging actively in the commercialization of knowledge. Commercialization was characterized metaphorically as a basketball game as, to work, it had to involve the research team, staff from the technology transfer office, and the team from the recipient firm in a series of spontaneous interactions. This differed from the linear model in which the knowledge was handed over by the researcher to the technology transfer office, which, in turn, protected the intellectual property and licensed it to the private sector. Commercialization was seen as a conduit for knowledge flow, both in the form of intellectual property and in human capital when skilled and well trained technology transfer officers, or the researchers, left the university for better paid jobs in the private sector.

Universities have demonstrated considerable flexibility over the many centuries of their existence and are expected to continue to adapt to the New Economy by providing high quality graduates, new knowledge through research, and problem-related knowledge through consultancy

services offered by academics. The flatness of organization, which was seen as essential to sharing, was a characteristic of universities but there remained a question about the success of multi-disciplinary teams in the discipline-oriented academic environment.

Universities, government departments, and firms, were all part of a system of actors engaged in the activities of knowledge generation, transmission and use, and linked together in ever changing networks that are there to solve problems. This systems approach to knowledge opens up discussion of the capacity to transmit knowledge (Can the graduate student write the paper? Can the technology transfer office find a firm to license the intellectual property? Can the Professor, who embodies the knowledge, sell his or her services to commercial clients?) – and the capacity to absorb it (Can the firm use the knowledge to create wealth, and if not, what has to be added to make this possible?). It also raises the question of how the activities of the knowledge system can be managed to generate wealth that can, in turn, be used to improve the quality of life.

Business

The Forum heard of a home furnishing shop which sees its purpose as providing a better life for people, using a challenging mission statement, a meaningful purpose, and shared values. It also generates wealth. Shared values recurred in a discussion of a document company that created a space for the sharing of context, the 'Ba', and a cement company shared its knowledge by having one data base, the Holderspace.

Other measures discussed, that were specific to the firm, were balance sheets for intangible assets and indicators of flows of intangibles, as opposed to stocks. The emphasis was on outcomes, rather than outputs. However, if outcome data were not available, the emphasis shifted to outputs, rather than to inputs. As with the other measures and means for

dealing with knowledge, these were aids to managing the firm. They did not provide the aggregate information needed for industrial policy.

To understand how such firms use knowledge management as part of the innovative process, for example, requires a different analytical framework from the conventional theory of the firm, and new statistical information, if statistical offices are going to be able to report on the differences in the propensity to use knowledge management techniques in industries across the economy. This would provide a map of the use of these techniques in such different industries as retail trade, offices of consulting engineers, or manufacturing of aerospace parts. The map would raise questions that are the province of government policy makers, and would generate another feedback loop in the knowledge system.

Government

For government departments to contribute to the New Economy, they must be prepared to open themselves to the flow of knowledge in the system. The example given was a department of industry which restructured itself to work with teams of bureaucrats, academics and business people to address problems and to make recommendations. This had all of the characteristics of an open, networked, interdisciplinary organization focused on the solution of a specific problem. It also meant that the teams dissolved and reformed as required. Government was seen as the provider of a sound framework for knowledge creation, transmission and use, anchored in shared values. It was also the provider of support, or leadership, where social benefits exceeded economic return on knowledge related investment. As an example, the Canadian government is developing a strategy to provide broadband access across the country. This is to support distance education and health services, and entrepreneurial activities in the business sector.

Where To Next?

More understanding is clearly needed of the linkages in the knowledge system, of the flow of knowledge between firms, government departments, universities, and people. This flow is vital to network building, and network building is part of the problem solving that leads to new knowledge which can be shared by members of the network. The network is a stock of social capital and a facilitator of knowledge generation, transmission and use.

Hierarchies are also stores of social capital, and the more stable hierarchical structure should not be excluded from the analysis of knowledge activities. In many organizations there are functions which require a well-defined division of labour, a hierarchical reporting relationship, and Taylorist quality control measures.

If the understanding of knowledge management is to move beyond the case study, official statisticians must, with knowledge management practitioners, develop taxonomies of knowledge management activities, with the elements sufficiently well defined so that they can be used in surveys to produce aggregate statistics which can then be used to support the policy process, and the public policy debate.

Appendix 1

OECD HIGH-LEVEL FORUM ON KNOWLEDGE MANAGEMENT THE NEW CHALLENGE FOR FIRMS AND ORGANIZATIONS

Session 1: The Knowledge-Based Economy and Knowledge Management From Macro to Micro

- Welcome: Dawn Nicholson-O'Brien, Executive Director, Corporate Renewal and Knowledge Management Office, Treasury Board Secretariat, Canada
- Jarl Bengtsson, Counsellor and Head of CERI, OECD
- Chair: Marie Tobin, Director General, Innovation Policy, Industry Canada
- Presenters: Michael Gibbons, Secretary General, Association of Commonwealth Universities, UK
"How Can Firms and Organisations Use Mode1/Mode2 Knowledge Production"
- B.Å. Lundvall, Aalborg University, Denmark
"Innovation Policy and Knowledge Management – the Interplay Between Firm Strategies and National Systems of Competence Building"
- Rapporteur: John de la Mothe, University of Ottawa, Canada

Session 2: Knowledge Management Strategies: Conceptual Frameworks and Case Studies

- Chair: Kurt Larsen, Principal Administrator, OECD/CERI
- Presenters: Larry Prusak, IBM, USA
"Review of Good Practices of Knowledge Management in Firms and Organizations"

Dominique Foray, Dauphine University, France
“Towards a Framework for Identifying Good Knowledge Management Strategies and Practices”

- Case Studies:
1. Göran Carstedt, Managing Director, Global Network Society for Organizational Learning, former President of IKEA Europe and IKEA North America
 2. Bill Collins, President, Ottawa Centre for Research and Innovation, Canada
 3. Harry Brantz, Assistant Vice President, Holderbank Cement, Switzerland
 4. Kazue Kikawada, Corporate Knowledge Lancer, Knowledge Design Initiative, Fuji Xerox, Japan
 5. Stephen M. Denning, Program Director, Knowledge Management, World Bank
- Rapporteur: Jorge Niosi, Université du Québec à Montréal, Canada

Session 3: Knowledge Management in Education: Conceptual Frameworks and Case Studies

- Chair: Ned Ellis, Director General, Social Sciences and Humanities Research Council, Canada
- Presenter: Sir David Watson, Professor and Director, Brighton University, UK
“Managing Knowledge Management: the role of universities”
- Case Studies:
1. Dale Shuttleworth, Executive Director, Training Renewal Foundation, Canada
“What Works in School Management in Nine Countries”
 2. Heather Munroe-Blum, Vice-President, Research and International Relations, University of Toronto, Canada

“Universities and Good Practices for Knowledge Management”

3. Hans Schuetze, Professor, University of British Columbia, Canada
“Knowledge Management in North American and European Universities”

Rapporteur: David Wolfe, University of Toronto, Canada

**Session 4:
 Management of Knowledge and
 Intellectual Property Rights Issues**

Chair: Riel Miller, Advisory Unit on Multidisciplinary Issues, OECD

Presenter: David Mowery, Professor, University of California at Berkeley, USA
“Intellectual Property as a Strategic Tool for Firms and the Consequences for University/Industry Relations”

Canada Pierre Fortier, Senior Advisor, Innovitech Inc, Montreal,
“Commercialization of University Research: A Comparison of Economic Performance Between Canada and the United States”

Rapporteur: Réjean Landry, Université Laval, Canada

**Session 5:
 Good Practices of Knowledge Management
 in Firms and Organisations**

Chair: Dawn Nicholson-O’Brien, Executive Director, Corporate Renewal and Knowledge Management Office, Treasury Board Secretariat, Canada

Presenter: Thomas Davenport, Professor, Andersen Consulting and Institute for Strategic Change, Boston University, USA
“What Kind of New Resources and Competencies do Firms and Organizations Have to Create and Acquire to Succeed in the Knowledge-Based Economy?”

Martin Brooks, Senior Research Officer and Jack Smith, National Research Council, Canada
“Navigating by Context: Knowledge and Networking Strategies for the NRC”

Karl Erik Sveiby, Professor, Sveiby Knowledge Management and Macquarie Graduate School of Management, Australia
“Progress Made in Developing Valid and Reliable Tools for Measuring Knowledge-Based Assets”

Rapporteur Meric Gertler, University of Toronto, Canada

Session 6: Sum up: Policy Implications and Lessons from the Previous Sessions?

Chair: Jarl Bengtsson, Counsellor and Head of CERI, OECD

Presenter: Jørgen Rosted, Permanent Secretary, Ministry of Industry and Trade, Denmark
“The Role of the Public Sector in Facilitating and Promoting Good Practices in Knowledge Management in Private Firms and Organizations”

Jean-Michel Saussois, Professor, Ecole Supérieure de Commerce de Paris, France
“Lessons and Perspectives for CERI Work on these Knowledge Management Issues”

Concluding Remarks: Fred Gault, Director, Science, Innovation and Electronic Information Division, Statistics Canada, Canada