THE KNOWLEDGE ECONOMY AND KNOWLEDGE MANAGEMENT

EDITORIAL

It is now over thirty years since Touraine and subsequently Bell foreshadowed a post-industrial society in which the production of goods would be overtaken by production of services, knowledge would become the basis of production, and white collar jobs would grow as blue collar jobs declined. Subsequent events have shown these predictions to be remarkably accurate. 'Knowledge intensive' enterprises have overtaken their physical resource intensive counterparts on world stock markets. Microsoft for example, with a mere 5% of General Motors' tangible assets had achieved a market capitalization three times that of the industrial giant by the mid '90s.

Average earnings in the USA of those with a university level education are now approaching three times that of those with a lower secondary education. Meantime the growth of business, technical and professional service firms has far outshone the manufacturing sector. The distinction between goods and services has in any event become less important, as both have become more knowledge intensive.

At a regional level, the distinctions between Anglo-American, Japanese and European forms of capitalism are becoming blurred, as knowledge becomes the lynchpin of all capitalist systems. Likewise, political ideologies have had to take a back seat as, for example, in the UK under the Blair administration, national governments come to grips with the effects of knowledge-driven change. Closer to home, the 'new economy' and 'knowledge nation' labels can be seen as reflections of different political slants on a set of common problems.

On the micro-economic stage, major corporates worldwide have started to develop knowledge-based strategies and appoint Chief Knowledge Officers and Knowledge Managers. Universities have started to offer Knowledge Management MBAs and similar post graduate courses. During the 1990s a number of divergent management approaches emerged, Northern European companies focusing on knowledge measurement and valuation, American companies on IT based approaches to knowledge management and Japanese companies on humanistic approaches to knowledge creation. These three movements are now starting to merge, leading to more holistic and broadly based strategies being adopted.

Inevitably the growing interest in knowledge as a strategic resource has led to a bandwagon effect, with technology vendors and consultants moving into the market offering a mixed bag of new ideas and repackaged old ideas branded as knowledge management solutions. The result has been predictably mixed — on the one hand some notable success stories, on the other a degree of frustration as solutions failed to match the hype.

More importantly knowledge management initiatives to date have generally reflected a view of the world still seen through industrial era lenses. From this perspective, knowledge is merely another resource to be managed using conventional techniques within traditional institutional and organizational settings. Such a static

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world view fails to take into account the revolutionary implications of knowledge driven change on institutional roles, organizational structures, stakeholder relationships and business strategies.

To appreciate these dynamics means thinking 'outside the box', focusing not so much on how to control and exploit what is already known, but on the knowledge needed to adapt to a range of possible futures. Gaining such a perspective means combining micro and macro-level perspectives, mapping and relating the implications of changes at the macro-economic level to changes at the individual or enterprise level.

This special issue of B-HERT thus has a twin focus. On the one hand, the implications of the knowledge economy, on the other, trends in knowledge management. Juxtaposing these perspectives will hopefully provide readers with some useful insights on the direction of change and the possible implications for themselves and their organizations.

The articles specially commissioned for this issue contain contributions from leading theorists and practitioners in the UK, USA and Japan, as well as Australia and New Zealand. Consistent with the overall theme of presenting and linking macro and micro-level perspectives, the articles have been broadly divided into two groups: the first group dealing with the broad implications of knowledge in the economy, the second group focusing on knowledge management research and practice.

McKeon and Weir provide an overview of the necessary preconditions for a knowledge-based economy based on current research by the Australian Department of Industry Science and Resources, involving a representative sample of APEC countries. This research confirms OECD reports which show that the most successful economies are those which are highly knowledge-based.

'...Such a static world view fails to take into account the revolutionary implications of knowledge driven change on institutional roles, organizational structures, stakeholder relationships and business strategies.'

Burgess focuses on the central importance of human knowledge in the new economy and the need for individuals, companies and government to address issues of career development, employment and skills development from a long term perspective. From a Government policy perspective this entails giving more priority to unemployment reduction measures, basic and continuing education, I.T. skills development and university funding. From an industry perspective Burgess argues it means thinking longer term and putting in training policies designed to maintain and sustain workforce capabilities.

Gibbons discusses how an increasingly complex and integrated economic environment promotes behavioural uncertainty, leading in turn to individual and organizational exploration across conventional boundaries. The resultant weakening of boundaries is examined from the perspective of new modes of knowledge production involving, in particular, a blurring of the lines between universities and industry.

The impact of uncertainty is echoed in Spender's paper, which poses the question as to what is 'new' about the new/knowledge economy. Spender's conclusion is that the value of knowledge management, contrary to many popular conceptions of its role, is essentially about managing firms' responses to an uncertain environment. He makes the point that whereas knowledge management to date has tended to concentrate either on I.T. based approaches to making (explicit) knowledge available and reusable, or on trying to explicate tacit knowledge, awareness of the profound uncertainties induced by economic change leads to an entirely different conception of knowledge management. In this Spender effectively bridges the gap between macro and micro-perspectives of the economy and knowledge management.

The second group of papers explores research and practice in the field of knowledge management.

Clarke provides an overview of knowledge management initiatives, drawing on research conducted into the knowledge management practices of leading organizations worldwide. A wide range of approaches are identified — common factors in successful initiations involving a close relationship between knowledge and business strategy and attention to both technological and human factors.

Shigeta's paper provides a practical example of how knowledge management techniques have been applied to improving sales performance in the case of a leading Japanese pharmaceutical company. The lessons learned

reinforce the value of behavioural approaches to KM and show how the 'spiral' of tacit-explicit knowledge conversion discussed by Nonaka can work in practice.

Scarbrough challenges the value of I.T. based attempts at managing knowledge through increasing its availability. He argues the need for a more action oriented approach based on social networking and knowledge sharing. This in turn implies a change in managerial style from top down to bottom up, and a shift in emphasis from I.T. systems to HR practices.

Denning's paper centers on the question of the need for incentives to encourage knowledge sharing, using as a case example the World Bank's knowledge management program. The experiences recounted suggest that removal of disincentives to sharing should be the primary goal.

Rosemann presents the case for integrating knowledge and process management. He provides practical illustrations of knowledge mapping and other knowledge representational techniques, to depict the links and gaps between operational processes and the knowledge required to perform them. Benefits are identified from both process management and knowledge management perspectives.

Little presents an overview of techniques and tools used by the Open University for managing knowledge at a distance. He discusses the evolution of the OU Learning model and suggests parallels with the emergence of networked organizations.

The final paper by Olsen draws on experience in New Zealand to discuss how the principles of learning systems may be applied to the machinery of government. Using complexity theory, this wide ranging paper charts a potential evolution of government systems and strategies, from electronic and information-based to knowledge-based.

It is a pleasure to provide to you this special issue. The increasing importance of knowledge in our economy is undeniable; while each article offers a unique and insightful examination of the role and nature of knowledge, the real benefit comes from an appreciation of the pervasive effect of knowledge across the whole economy, at a macro, micro and individual level. I thank all the authors for their contributions and B-HERT for its assistance and support. ◆

PRESIDENT'S MESSAGE

May was certainly a busy month for the Business/Higher Education Round Table, with a number of very successful functions held. A Working Lunch with Mark Latham, MP (Federal Member for Werriwa) was an excellent opportunity for the members present to hear for themselves Mark's deep interest in education and his commitment to the principle of Lifelong Learning.

A few days later, the British High Commissioner to Australia, The Rt. Hon. Sir Alastair Goodlad KCMG, addressed members and guests on the subject *"Britain and Australia Today"*. This was a timely meeting in view of the many changes occurring in the UK and the EU, some of which directly affect Australia. The following week, a full meeting of members was followed by dinner at which Dawn Casey, Director of the new National Museum of Australia, gave a fascinating address on *"Museums, Education and the Nation's Future"*. (This caused me to visit the National Museum on a recent trip to Canberra and I was particularly impressed by the innovative design and foresight shown by its creators.)

The month ended with a two-day conference *Entrepreneurial Australia: Future Australia*, which made a significant contribution to progressing the changes needed for Australians to become more creative and innovative. The 150 enthusiastic participants included budding and experienced entrepreneurs, venture capitalists, academics, educators, researchers, Government and industry representatives and other interested parties. Approximately 45 panellists and guest speakers created a stimulating environment in which many useful discussions were held and new contacts made. The Executive Director, Ashley Goldsworthy, and his team are to be congratulated for organising such a successful event and for continuing to enhance B-HERT's reputation in the wider community.

This issue of B-HERT NEWS focuses on the twin subjects of the knowledge economy and knowledge management. It is another example of the major contributions to policy which B-HERT publications make on topics of national importance. ◆

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PRECONDITIONS FOR A KNOWLEDGE-BASED ECONOMY

Why is the KBE important?

The term "knowledge-based economy" recognises the crucial role knowledge, in all its forms, plays in economic processes. The interaction of the mutually reinforcing pressures from the internationalisation of business and the drive for innovation and new knowledge makes the emerging business environment (the so-called "new economy") quite different from anything experienced in the past, thereby raising new challenges for public policy.

A knowledge-based economy (KBE) is an economy in which the production, distribution, and use of knowledge is the main driver of growth, wealth creation and employment across all industries. In this context, being a KBE means more than simply having a thriving "new economy" or "information economy" somehow separate from a stagnant "old economy". In a truly knowledge-based economy, all sectors have become knowledge-intensive, not just those usually called "high technology".

In a recent report for APEC we identified four key dimensions of a knowledge-based economy.

- Innovation and technological change are pervasive, and supported by an effective national innovation system (i.e. a network of institutions in the public and private sector whose activities and interactions initiate, import, modify, and diffuse new technologies and practices).
- Human resource development is pervasive: education and training are of high standard, widespread and continue throughout a person's working life and beyond.
- An efficient infrastructure operates, particularly in information and communications technology (ICT) which allows citizens and businesses to readily and affordably access pertinent information from around the world.
- The business environment (i.e. the economic and legal policies of government, and the mix of enterprises operating in the economy) is supportive of enterprise and innovation.

The empirical evidence in that APEC report and in the OECD's growth project strongly suggests that economic growth is most sustainable for those countries which are strong in all of these four dimensions. In short, it is becoming ever more the case that the most successful economies are those that are closest to being KBEs.

The APEC report

In light of growing international interest in the KBE, APEC Leaders (Prime Ministers) commissioned a report on knowledge-based economies from our team at the Department of Industry Science and Resources and collaborators in Canada and Korea. The report begins by assessing the progress of a representative sample of APEC economies towards KBEs. The sample includes Australia, Canada, Korea, Singapore, Thailand, Philippines and Chile. Comparing the characteristics of these real economies to each other and to those of an idealised KBE suggests that for an economy at any particular stage of development, certain characteristics have to be put in place before it can move closer to becoming a KBE. Such characteristics are referred to as preconditions. Having identified these desirable directions for change, the report then suggests some possible instruments that might be appropriate to move a particular economy further in that direction.

Preconditions for a KBE

Basic education is a long-term investment without which a KBE is unsustainable. In a fully developed KBE, high quality education services that are both widely available and widely used are a major priority for the economy and society. Without this foundation it is virtually impossible to build the other elements of the national knowledge base (such as R&D) to the level needed by a KBE. A major responsibility of government is therefore to ensure that such education services are in place.

ICT can be seen as enabling technologies for a KBE. Advanced information systems bring down the cost of information and facilitate access to wider pools of information and promote the spread of ideas. Accordingly, a fully developed KBE has an advanced communications network and a policy and regulatory framework that encourages competition and supports the development and use of information hardware and applications. Because of the centrality of digitised information in a KBE, the telecommunications infrastructure in a KBE needs to include high bandwidth communication (which allow the possibility of on-line video and health and education services).

As ICT technology is evolving, the supporting infrastructure must be continually renewed and upgraded. This opens the possibility for an economy to save the cost of investment in one level of technology and go directly to a more advanced level (e.g. going directly to mobile telephones without a wired network).

No nation has a monopoly on good ideas. The growth of a nation's knowledge base – including its widening into new fields – depends critically on its culture being open to new ideas, and especially to new ideas from outside.

A KBE can flourish only if the social, political, economic and legal framework of that country is conducive to the development of the characteristics described above. In a KBE an open environment for trade and investment helps create an incentive for innovation and allows for the implementation of technologies involving significant scale economies. A significant effort is also made to ensure that technology brought into the economy through foreign investment becomes a real and active part of the local knowledge base, through conscious adaptation and technology transfer. At the same time, support is available to encourage research into more general areas of knowledge development. The policy and institutional environment of a KBE promotes beneficial spill-overs from encouraging interaction and co-operation among researchers in different institutions, disciplines and industries.

It also entails a policy and social framework attractive for investment in the future, and which handles structural transitions with social sensitivity. This includes such aspects as a competitive but fair regulatory environment for business, transparency of government and company reporting, an accepted rule of law, low inflation and interest rates, and a "safety net" to assist people to adapt to new social and economic structures without social turbulence.

Some international comparisons

The report presents sets of quantitative indicators in an attempt to capture the general stage of development of the sample APEC member economies relative to a fully developed knowledge-based economy, and the economies current potential to become a KBE. The indicators are divided into groups corresponding to the four key dimensions of a KBE listed above, namely business environment, ICT infrastructure, innovation system, and human resource development.

Canada and Australia, not surprisingly, show up as mid-range OECD countries for most of the economic and social indicators considered, as is typical of long industrialised economies, although both are relatively strong in ICT infrastructure. That both are well on the way to becoming KBEs is shown by their both having around 50% of GDP attributable to "knowledge-based industries", and a workforce of which over 30% are "knowledge workers".

The indicators for Singapore are remarkably similar to those for Australia and Canada, while Korea is not far behind (it lags in the openness and transparency of its business environment, and in some ICT indicators).

Thus the high performing Asian economies are comparable to the longer industrialised economies in APEC in their movement towards a KBE. This is closely related to the explicit and well-resourced national strategies of both Korea and Singapore to become KBEs, a "natural" evolution from the industrial strategies they have successfully pursued for the last few decades. Both Korea and Singapore have committed substantial resources to building their base in education, science and ICT infrastructure. Their experience and that of Taiwan and Hong Kong, especially when contrasted with that of Thailand and the Philippines suggests that wider and deeper education is the key precondition before the other aspects can take off.

"Backing Australia's Ability"

Australia has a remarkable record of economic growth and rising productivity through the 1990s. The Government considers that much of this is attributable to the attention it has paid to the business environment. Although the Government already spends some $4.5 billion annually in support of research, development, and innovation, there had been much concern expressed by the Business Council of Australia, the Australian Vice Chancellors' Committee and others that Australia was not keeping up with its competitors in the other dimensions of a KBE. In January this year, the Prime Minister explicitly recognised these concerns in announcing a $2.9billion package of additional funding over five years to support R&D, innovation and education. Introducing the Backing Australia's Ability statement, he spoke of the need to "not only consolidate but entrench our current economic strength through the tangible benefits generated by technological change, software revolutions, scientific innovation and the expanding frontiers of the knowledge economy". ◆

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WORKFORCE DEVELOPMENTS AND THE KNOWLEDGE ECONOMY IN AUSTRALIA

Knowledge workers apply and process information and data in their work tasks. The key productive input is data and information, the transformation is through processing and application, and the main output are services related to the knowledge. Knowledge can be acquired through education, learning and training, or it can be attained through creativity and innovation. The process of knowledge acquisition and dissemination has been facilitated through advances in IT and global communications.

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There are a number of characteristics about knowledge-based work that make it difficult to analyse in conventional employment typologies. First, knowledge-based work is neither industry nor occupationally specific. Knowledge-based work can be found in agriculture, manufacturing and services. Second, knowledge-based work extends beyond professional occupations such as teaching and medicine where knowledge imparts professional competency. Knowledge processing can transform all work functions and all occupations from the most mundane to the most technically advanced. Third, knowledge-based work extends beyond the IT sector whether it be hardware development or software applications. The IT revolution has transmitted and facilitated knowledge based production and employment across sectors and countries, but the IT sector is one important part of the overall transformation that is occurring. The same observations apply to the IT related communications sector. Fourth, knowledge-based competencies are transitory and incomplete since there is always new information and data to acquire, process and apply. In this context training and education become imperative and ongoing. Finally, people are the most precious resource in a knowledge-based economy.

How Has the Australian Workforce Been Restructured?

There has been eight years of continuous employment growth in Australia since the recession of 1990-1992. In this period of upturn the changes to the workforce have been profound. Changes that are relevant to the discussion of knowledge based employment are briefly outlined.

a. *Employment by industry.* Of the almost 1.3m. jobs created between 1993 and 2000 around 70% of the additional jobs came from four sectors: property and business services, retail trade, construction, and health and community services. Three of these sectors are knowledge based. Employment in some industries declined – mining, utilities and government administration. For other industries employment grew only marginally – manufacturing, transport and communication services.

b. *Employment by occupation and skill.* Using the standard classification of occupations by skill, Cully (1999, 101) demonstrated that during the course of the recovery that the highest annual job growth by occupational groups were elementary clerical, sales and service workers (5.9%) and professionals (5.2%). The lowest annual growth was recorded for advanced clerical and sales workers (-0.4%) and tradespersons (1%). In terms of changes by skill level Cully (1999, 102) demonstrated a polarisation of employment growth by skills. Growing employment shares occurred in the high skilled and unskilled occupations while contracting employment shares occurred in intermediate skilled occupations.

How Many Knowledge Workers Are There?

Dunlop and Sheehan (1995) modified the existing industrial divisions to highlight the important contribution of knowledge-based services in the economy. They divided industries into goods producing, goods related services and persons and knowledge-based services. The process does involve approximation and assumption, but it can provide a broad overview of developments in employment, output and skill application. They demonstrated that over the period 1985/6 to 1995/6 that employment in the goods producing industries expanded annually by 0.1%, employment in the goods related service industries expanded annually by 2% and employment in the persons and knowledge-based services sector increased annually by 3.4%. The table (below) takes up the analysis for the period 1996-2000. It demonstrates a continuation of the trend towards employment in person and knowledge-based services.

Rethinking Skills and Training

The development of a knowledge-based economy requires industry and individuals to be looking towards knowledge acquisition and developing skills that facilitate knowledge acquisition and knowledge application. For industry the challenges are fairly clear-cut. First, they need to invest in research and development, which in turn generates information. Second, they need to innovate and apply IT towards developing new products, new processes and new markets. Third, they need to think global in terms of market opportunity but also potential competitive threats. Fourth, they need to invest in and develop knowledge-based skills within the workplace. There should be a continuous process of skill acquisition. Fifth, people are the most valuable resource in the knowledge-based economy, that means developing remuneration and incentive systems that attract quality staff and retain quality staff.

For individuals it will mean that a career is no longer company, industry or country-specific. Knowledge-based skills are highly portable and individuals will have to be able to be mobile between industries and countries. Opportunities will also arise for small business

start-ups and risk-taking ventures based on specific knowledge-based applications. Knowledge acquisition and acquiring the relevant skills for knowledge processing and application will be a continuous process as data and information accrue in perpetuity.

Knowledge-based skills are not necessarily formalised. Access to knowledge and knowledge processing is being facilitated for growing numbers through the spread of IT and global communications. Nevertheless, core skills remain important – literacy, numeracy, mathematics and IT skills. A formal education base also remains important in science, engineering, medicine, law, humanities and social sciences. From such building blocks knowledge can be adapted and advanced through specific problem applications and through research and development.

Unemployment and Inequality

Despite the profound developments and applications in IT and global communications, and despite 8 years of strong employment and earnings growth there are still major labour market problems and major inequalities across the Australian community. First, high rates of unemployment persist. The proportion of skilled workers in the workforce is increasing, those without skills can expect to face severe problems in accessing a job. In addition, unskilled jobs tend to be more seasonal, short-term and have a much higher turnover than skilled jobs. For the unskilled, it is a problem in not only getting a job, but also keeping it. (Vickery, 1999). Second, new contours in earnings inequality are emerging. There is a strong spatial dimension in inequality, non-metropolitan Australia is missing out on jobs and earnings growth (Smith Family, 2001). There is also emerging inequality within enterprises, industries and occupations (Watts and Burgess, 2000). Put this down to the differences in earnings and opportunities between full-time and permanent jobs, and between part-time and/or casual jobs. Finally, there is an uneven access to knowledge skills either through IT access, or through a lack of basic training and education. As a result knowledge-based access inequalities are also increasing. There is a wage premium attached to workers who use computers in their job, in turn computer usage is linked with educational attainment (Miller and Mulvey, 1997).

SOURCE: ABS THE LABOUR FORCE (CATALOGUE 6203.0). GOVERNMENT ADMINISTRATION AND DEFENCE NOT ALLOCATED. FIGURES ROUNDED.

Employment by Industry 1996-2000 (August)

	Emp '96 '000	Emp '00 '000	1996 % share	2000 % share		Emp '96 '000	Emp '00 '000	1996 % share	2000 % share
Goods Producing					**Person & Knowledge-based Goods**				
Agriculture	422	444	5.23	5.10	Communications	164	175	2.03	2.01
Mining	91	79	1.12	0.91	Property & business services	812	1070	10.07	12.30
Manufacturing	1193	1144	14.79	13.15	Accommodation & cafes	378	459	4.69	5.28
Utilities	68	65	0.84	0.75	Finance & insurance	312	329	3.87	3.78
Construction	603	713	7.48	8.20	Education	590	634	7.31	7.29
Total	2377	2445	29.47	28.12	Health & community services	765	852	9.49	9.80
					Culture & Rec services	188	221	2.33	2.54
Goods Related Services					Personal & other services	355	332	4.40	3.81
Wholesale trade	494	454	6.12	5.22	Total	3564	4072	44.19	46.83
Retail trade	1238	1306	15.35	15.02					
Transport	392	418	4.86	4.81					
Total	2124	2178	26.33	25.04					

Policy Issues

First, unemployment is costly to the individuals concerned and to the community. Greater emphasis needs to be given to unemployment reduction and the consequential positive impact on community and regions. Second, education counts in job access, career advancement and the acquisition of knowledge-based skills (Smith Family, 2001). Governments should be striving to increase school retention rates and participation rates in post-secondary education. Third, access to IT skills also counts, IT and network access should be universal. Educational attainment and IT skills tend to be complementary and reinforcing. Fourth, funding research and scholarship at universities is also important. This should include expanded partnership arrangements internationally and with industry. It should also include expanded funding for international student exchanges and for post-graduate scholarships for local and international students. Fifth, industry expenditure on training is declining for a number of reasons, not the least of which is related to the growth in part-time and casual employment and in outsourcing, together with the privatisation of public sector business enterprises (Connell and Burgess, 2001). The internal labour market is contracting and is now less likely than in the past to be a source for training and skill acquisition. Short-term solutions to skill shortages such as poaching and sponsored immigration are difficult to sustain in the longer-term. Industry needs to think long-term and to put in policies that continually update skills, retain staff and offer career opportunities. ✦

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JOINT PRODUCTION OF KNOWLEDGE: A NEW RESEARCH AGENDA

It behoves organisations that are attempting to play bridging roles to consider whether the models that they are working with still correspond to developments in the real world. There is hardly a better example of the persistence of outdated conceptions than those which govern our thinking about the relationship between universities and industry.

These conceptions are outdated in three principal respects. First, they take no account of the changes that are taking place in society, that is, in the way institutions – universities and industry, in this case – are responding to changes in a world more highly integrated and increasingly, it seems, dependent on knowledge production. Second, they fail to recognise that the way research is carried out has changed and that a new set of research practices have come into play, not least amongst the elite researchers in both universities and industry. Neither, and third, is it grasped that these broad changes are correlated; that the way research is now carried out is closely related to broader social and institutional change.

With regard to the first, it is possible to grasp what is going on in the wider society by considering the relationships between four terms: complexity, uncertainty, exploration and permeability. Briefly, the nexus of terms constitute a set of linked processes that have the overall effect of generating greater organisational flexibility and institutional openness. These processes, then, constitute a scheme of recurrence in which complexity, uncertainty, individual and social exploration, and permeability re-enforce one another, rather as positive feedback loops do in electronic control systems. To illustrate: our increasingly

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complex (more integrated) world generates behavioural uncertainty, behavioural uncertainty induces individuals and groups to explore alternatives more vigorously. Such exploration promotes permeability as interaction amongst individuals and groups move back and forth across heretofore established boundaries. For every one, but perhaps moreso for researchers, moving across boundaries can challenge individual identities and weaken organisational and institutional loyalties in part because these movements affect what problems researchers work on and with whom. This dispersion of the locus of activity, in turn, generates even greater complexity and so the cycle enters into a second iteration, etc. The weakening of boundaries adumbrated in this scheme is now a widespread phenomenon and is evident in the parallel but reduced usefulness of traditional categories to describe what were formerly thought to be relatively fixed forms; for example, the market, the state and culture. Traditional categories such as these have ceased to function in the familiar way. Indeed, their definitional forms now seem less useful than they once were. Of course, this scheme also operates with respect to the institutions of science and technology. These activities, too, have begun to spill outside of their conventional boundaries. How often do we now hear that the traditional distinctions between science and technology or between pure and applied science have lost their clarifying edge?

This brings us to the second theme, the emergence of a new set of research practices which in every respect differ from those thought to characterise research in universities. My colleagues and I have labelled the new set of characteristics as Mode 2 to distinguish it from Mode 1 which may be more familiar to readers as the disciplinary structure of science (see for example, M. Gibbons, et al. The New Production of Knowledge, Sage (1994)). Analytically, these attributes can be used to allow the principal differences between Mode 1 and Mode 2 to be specified. Thus, and very briefly:

– in Mode 1 problems are set and solved in a context governed by the, largely academic, interests of a specific community. By contrast, in Mode 2 knowledge is produced in a **context of application**;

– Mode 1 is disciplinary while Mode 2 is **transdisciplinary**;

– Mode 1 is characterised by relative homogeneity of skills, Mode 2 by their **heterogeneity**;

– in organisational terms, Mode 1 is hierarchical and, in academic life at least, has tended to preserve its form, while in Mode 2 the preference is for **flatter hierarchies** using organisational structures which are transient.

– in comparison with Mode 1, Mode 2 is more **socially accountable and reflexive**.

– Mode 1 and Mode 2 each employ a different type of quality control. Peer review still exists to be sure but in Mode 2 it includes a wider, more temporary and heterogeneous set of practitioners, collaborating on a problem defined in a specific and localised context. As such, in comparison with Mode 1, Mode 2

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involves **a much expanded system of quality control.**

These social and cognitive changes are not confined to science and technology. They appear right across the research spectrum and when taken together have sufficient coherence to suggest the emergence of a new mode of knowledge production.

The third theme pertains to the relationship between the first and second themes. The changes in the organisation of society and the new modes of knowledge production are connected. As has been seen, the scheme of recurrence progressively and over time establishes a loop between complexity through exploration to permeability opens up social institutions which, in turn, is necessary for the collaborative working that underlies Mode 2 science. Similarly, the intellectual excitement and challenges presented to researchers working in the context of application further articulates an increasingly open social structure. In other words, there is a case for considering that the two processes are linked in a process of co-evolution. (This argument is more fully developed in H. Nowotny, P. Scott and M. Gibbons, **Re-thinking Science**, Polity Press, London (2001))

The import of these changes for those organisations that would play bridging roles between universities and

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industry are hard to over estimate. The cycle between complexity through permeability establishes the factors which are promoting institutional openness and blurring of the lines, at least in research terms, between industry and the universities. Few nowadays find it useful to consider that knowledge is produced primarily in two distinct types of institutions – universities for long term, pure, research, industry for short term, applied research. In the best universities and in the most competitive firms, experts of diverse institutional backgrounds are engaged under the research practices described as Mode 2 on complex problems which, to say the least of it, involve many diverse knowledge inputs.

Secondly, at the forefront of many of the sciences, say of materials, biology/technology and communications, many challenging problems arise in the context of application and the best brains want to work on them and they are doing so. The result is that leading edge research can be located outside the disciplinary structure and, because of the complexity of the problems being addressed, can involve many different knowledge producers – not only those in universities and industry – collaborating in the joint production of knowledge. This development has important implications, in particular for two activities that have become problematic for both universities and industry:

that is, technology transfer and the management of intellectual property.

With regard to the former, most universities now have established offices of technology transfer as part of their strategy to raise funds through the commercialisation of the results of their research. Historically, these organisations have been conceived as essentially bridging institutions. They are meant to bring the ideas of university science into the market place. But offices of technology transfer represent a solution to a problem that arose in a different research environment – Mode 1 – and a different more institutionally closed society. As they are structured currently, they are ill-equipped to deal with Mode 2 knowledge production and the high degrees of interaction between knowledge producers that need to take place in the joint production of knowledge.

Secondly, the social and cognitive changes that have been adumbrated call into question the traditional ways of dealing with the ownership of intellectual property. Again, the preferred solution here has been to concentrate on patenting discoveries and to seek, as a route to commercialisation, licensing arrangements with industry. But what is the status of ownership of intellectual property in a regime characterised by the joint production of knowledge, where the knowledge is produced in a range of shifting collaborative contexts, including various types of networks, alliances and partnerships. Here, group membership is highly volatile, changing as problem contexts evolve and as the self interest of researchers waxes or wanes. Shifting membership on complex problem solving teams implies that essential elements of knowledge, because they are embodied, are more or less continuously on the move long before anything like a patent becomes a possibility. As we are gradually beginning to discover, joint production of knowledge requires a different approach to the protection of intellectual property, one that seems to be taking the form more of managing the human resources than of trying to capture a discovery in a patent. In other words, the protection of intellectual property has become a facet of an organisation's human resource management policies. There is much creative work to be done here to accommodate research and technology transfer offices more effectively to the contemporary research environment.

In summary, the changes taking place in the wider society are mirrored in the changes taking place in the day-to-day conduct of research. These changes, only a few of which have been outlined here, have deep implications for the way we conceive university-industry relationships, the organisations that we put in place to manage them, and the rewards that our intellectual leaders, who may increasingly come to occupy "spaces" somewhere in between established institutions, are going to demand. ◆

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MANAGEMENT'S OPTIONS IN THE KNOWLEDGE ECONOMY

At business schools we spend a lot of their time teaching students about decision-making, following the path-breaking work of Cyert, Simon, March, and others from Carnegie Mellon. We teach them that gathering and evaluating data is what managers do. This sounds pretty much like knowledge management. So what is new about the 'knowledge economy' and does it affect what managers are supposed to be doing?

Does it affect our established ideas about the interactions between firms, their competitors and their markets? Does it affect those national policy-makers whose job it is to manage the economy? For most KM (knowledge management) writers the answers are not completely clear. If there is a difference between KM and conventional corporate decision-making it is largely in two ways. One is that the power of modern information technology has generated a qualitative change in these processes. It is now completely realistic to think that the bulk of the firm's knowledge can be gathered together in a query-friendly database and made instantly accessible. This opens up the prospect of major savings from not 're-inventing the wheel'. There will be new synergies between old experience and new challenges, from getting the information to the person that needs it – fast.

> **…major savings from not 're-inventing the wheel'.**

The second dimension deals with the difference between objective knowledge the type presumed by the decision-making theorists and the tacit skills made popular by Polanyi. The idea of tacit knowledge is intriguing but it is difficult to know what to do with it. One group, following Nonaka & Takeuchi and Boisot, believes that the challenge is to codify it, make it explicit and thus manageable. Another group, following March, Teece and others, argues that managers need to be mindful of how difficult it is to control, exploit, protect, or appropriate the value of less-than-fully explicit organizational knowledge. Such knowledge is managerially intractable, at one time too slippery, at another too sticky.

These two lines of discussion are clearly valuable. They help managers understand how the contemporary world differs from that presumed by the last generation's decision theorists. But on their own, pronouncements that in the knowledge economy manual labor is displaced by 'knowledge work', do not help. It is seldom clear what knowledge work is other than non-manual. But when writers such as Reich tell us that modern workers are manipulators of symbols rather than materials, that helps. We can understand management's insecurities about the firm's assets 'going home in the evening' – for their control is increasingly threatened – even though this was also true in the craft economy that preceded modern factory-based work.

Both lines of argument are really nuances on old themes and there is little to suggest that the knowledge-economy is a new 'ball-game' demanding new managerial skills. With the benefit of hindsight we see that the bursting of the dot.com bubble demonstrated that the economic impact of the Internet is less about quickly made fortunes, for many quick fortunes were also made in the railway or oil rush years, than about the integration of modern communications, transportation, and power into our existing industrial practices be they selling books or apparel, booking travel, shipping packaged foods, or providing education and healthcare. It

may be that these new IT capabilities have tapped an unanticipated demand for personal communication and information (email and Web cruising), much as the markets for telephones, copiers, and TVs were vastly under-estimated. But we do not argue that these technologies introduced new 'economies'.

There may be another story about the knowledge-economy, one that takes off from pervasive economic and social change rather than new technology, one that tags the 'old economy' as one in which managers could make forecasts and use them to guide their profit- or market share- maximizing decisions. If, as we might argue, in today's economy the business forecast has to be replaced by the entrepreneur's vision of what the market may be persuaded to become, that would be new and would carry important implications for managers everywhere. This argument would be that the strategically significant thing about technological change is not as the economists suggest the change in the 'production function', in lowered production costs. Rather it is that technological change is now the principal source of uncertainty in most industries. In times past there were other uncertainties such as politics, war, and crop failure. These new uncertainties seem more extensive and less controllable.

We see that KM is not simply about managing the firm's knowledge, the two themes mentioned above. It is also about managing the firm's response to uncertainty, defined as the absence of knowledge, especially knowledge about the future behavior of competitors and markets. Knowing how to respond to the absence of understanding take us to creativity and entrepreneurship. Creativity leads to knowledge that removes or resolves uncertainty. Asking managers to be creative is very different from turning them into data-crunching decision-making automata equipped with ever-more powerful IT. The current crisis in education, both managerial and general, is about the way natural creativity is crushed rather than developed.

> **The instabilities of chaos theory seem more relevant that the mechanical prescriptions of decision theory.**

Thus a third theme among KM writers, albeit less popular, considers how managers deal with the challenges presented by the rising levels of economic uncertainty that are the evident result of technological change and the globalization of trade and capital in a relatively conflict free world. These are characteristics that might convince us there is indeed something completely novel about the contemporary business environment. The instabilities of chaos theory seem more relevant that the mechanical prescriptions of decision theory.

Progress however is not easy. One can argue that creativity is an even less useful concept than tacit knowledge, for it connotes the unexplainable. We do

not have a good theory of business entrepreneurship, let alone explain the creativity of a Picasso, Thomas Edison, or Tiger Woods.

If we had a good theory of business creativity, that would give us good insight into entrepreneurship and other kinds of organizational knowledge creation. One fruitful line of thought goes back to Marshall and Florence Sargent who pondered the paradox of industrial concentration, of why competitors clustered into 'industrial regions' when that would seem to increase the difficulties facing managers dealing with technologically and informationally driven competitive challenge. Why do brokers cluster on Wall Street, the high-tech firms in Silicon Valley, or the Italian knitwear specialists in Emiglia-Romagna, just as the cutlers clustered in Sheffield in Marshall's time? Now the key corporate knowledge not only goes home in the evening but can also walk across the street to the competitor. Certainty-based micro-economic arguments seldom explain this behavior, as Best, Saxenian, and others have shown. Uncertainty-based arguments may have better legs.

The idea is that only by being around each other can any of the managers hear the informal buzz and exchange the ideas that give them a sense of controllability in the face of the evident uncertainties. We have to remember that Sheffield is no longer the world center of cutlery, nor is Switzerland the watch industry's principal player. Perhaps clustering is an uncertainty-containment KM behavior rather than a proven way of stopping the march of history or technological progress. It is a type of collective creativity in the face of shared economic uncertainties. Paraphrasing Williamson, we might characterize it as a collective structural solution for firm level creativity designed to deal with the failure of the market.

Analyzing collective action as a response to shared uncertainties takes us into institutional theory. Regional clustering is a spatial aspect of the mental process of creating common knowledge just as conferences work in the same way. We can borrow from North's definition of social institutions as the collectively generated apparatus designed to deal with that society's prevalent and most disturbing uncertainties. Within the field of business, we can see that the development of collective instruments and processes such as markets, insurance, banking, property legislation, and the limited joint-stock company is crucial to any explanation of the development of the world economy. Hayek's notion of the market is that which, by resolving uncertainties together, allows economic players to create the crucial pricing knowledge necessary for business to be done by rational managers.

This third thread of knowledge management thinking is wholly focused on the absorption and resolution of business uncertainties. The implied concept of knowledge is quite unlike that of the first two threads. While they depend on 'facts' and the certainties of scientific knowledge – albeit falsifiable – our third thread sees knowledge as that which is merely sufficient to explain and support corporate action under irresolvably uncertain conditions. It focuses on collective behaviors that let managers feel that things are under control without suggesting that the world is thereby changed from less certain to more certain.

These ideas have been examined in other contexts, notably Kuhn's well-known analysis of scientific paradigms, collectively generated knowledge about physical phenomena and accepted explanations. A paradigm can be seen as a mental or knowledge 'institution'. Likewise, in business, we see that industries adopt different 'recipes' or shared ways of thinking about customers and competitors. Each recipe is a collectively created and adopted way of dealing with the principal uncertainties perceived in that industry's business environment.

Kuhn showed how such paradigms – or scientific 'industry recipes' – might suddenly shift and change as a new uncertainty was recognized. We know an industry can be transformed, sometimes without significant technological change, when an entrepreneur manages to seize the market's uncertainties and open-ness to redefinition. Thus the airline business was revolutionized by the 'invention' of charter flights. The fashion business is constantly being re-invented by re-conceptualizations that seize the market's imagination. There are times when two different recipes

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We do not have a good theory of business entrepreneurship, let alone explain the creativity of a Picasso, Thomas Edison, or Tiger Woods.

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compete to dominate an industry's thinking such as the tussle now joined between Boeing's higher speed next generation airliners and Airbus's super-large new monster. Likewise there are struggles over industry standards a very specific form of knowledge that lead to path dependent evolution of that industry. Strategic alliances are an important device for bringing affected others customers or competitors – into a collective that together can absorb uncertainties that were otherwise considered unmanageable.

The value of thinking about organizational knowledge and KM is not simply to repackage the familiar decision-making notions of what managers, firms and markets do. It enables us to elaborate a balanced model in which the yin of fact-based analysis is countered by the yang of uncertainty-based behaviors. We see that managers need to be helped to combine disciplined analysis of the facts that are available in increasing amounts with insight into the ways the ever-present uncertainties can be managed. There are many famous stories of how timid generals have been paralyzed by the situation's uncertainties and have so lost battles to inferior forces that seized the day and exploited those same uncertainties. By considering all three threads, KM can help managers focus on the uncertainties that their firms confront and make them more aware of the ways in which these knowledge gaps can be managed. This could add materially to the vast body of decision-making literature that presumes the most important information is always available – now even faster. ◆

INTERNATIONAL BEST PRACTICE IN KNOWLEDGE MANAGEMENT

INTRODUCTION

Knowledge is becoming recognised as both the foundation of competitive advantage and the basis of market capitalisation of companies. With breathtaking rapidity the knowledge economy has arrived. In a survey of international best practice in knowledge management in leading international corporations conducted by Christine Rollo and myself for Standards Australia in support of their publication of a knowledge management framework, we were surprised to discover the range of knowledge management initiatives across industry sectors (Table 1). Knowledge management is called many different things, and every company has its own distinctive approach, but connecting all of these initiatives is a commitment by companies to developing the production and flow of knowledge, the transmission and use of knowledge to create economic value.

From the many corporate approaches to knowledge management it is possible to discern several distinct strategies. Firstly chemical and pharmaceutical companies and other organisations with significant sunk investment in research and development, seek to leverage the intellectual capital they already possess, by for example utilising existing patents more effectively and speeding up the process of patent application. A second group of companies engaged in manufacturing in highly competitive international markets such as Texas Instruments in consumer electronics, or Ford and General Motors in automobiles, seek to use knowledge management techniques to enhance and speed up the process of best practice sharing across multiple international production sites. (In this mode knowledge management partly represents a further advance of total quality management). A third group of companies with large client bases such as banks and insurance companies utilise knowledge management to improve data mining and exchange between different functions and managers of the company in order to develop customer relationships and pursue further business opportunities with existing customers. Finally professional service companies such as the large accountancy and management consultancies employ knowledge management to create knowledge networks that allow the ready sharing of knowledge from complex assignments to allow the application of state-of-the-art solutions to particular client problems.

◗ Drivers of Knowledge Management

Globalisation, accelerated technological change, shorter product life-cycles, and mass customisation are driving the competitive pace of innovation and networking.

Table 1:

◗ Companies Developing Knowledge Management Strategies – Management Strategies

◗Agro-K Corporation – Agricultural Knowledge	Knowledge Systems ◗Chase Manhattan Corporation – Relationship Knowledge Management	Boundaryless Learning Culture ◗General Motors – Knowledge Network	With Knowledge ◗Rolls Royce – Knowledge Engineering
◗Amazon.com – Internet Customer Capital		◗Hewlett-Packard – Learning Communities	◗Seimens – Communities of Practice
◗Arthur Andersen – Knowledge Consultant Group	◗Chevron – Industry Best Practice	◗Hoffman LaRoche – Knowledge Map	◗Shell – Learning Centres
◗AT & T – Internet Enabled Knowledge	◗Cisco Systems – Leveraging Intangible Assets	◗IBM – Intellectual Capital Management	◗Skandia – Human and Intellectual Capital
◗Bank of Montreal – Business Intelligence	◗DaimlerChrysler – Automotive Intelligence	◗KPMG – Knowledge Web	◗Telstra – Information Velocity
◗Boeing – Digital Cooperative Work	◗Dow Chemicals – Intellectual Capital	◗McKinsey & Co – Client Knowledge Repository	◗Texas Instruments – Best Practice Sharing
◗BP Amoco – Multimedia Collaborative Network	◗Ernst & Young – Network of Knowledge Centres	◗Microsoft – Digital Nervous System	◗United Technologies – Communities of Practice
◗Buckman Laboratories – Customer Knowledge Bases	◗FedEx – Internet Intelligent Commerce	◗Motorola – Knowledge Leadership	◗US Department of Defence – Knowledge Network
◗Canadian Imperial Bank of Commerce – Leveraging Human Capital	◗Ford Motors – Leveraging Intellectual Capital	◗Pfizer – Collaborative Intelligence	◗Westpac – Knowledge Transfer
◗Charles Schwab & Co –	◗General Electric –	◗PriceWaterhousecoopers – Empowering Employees	◗World Bank – Knowledge Bank
			◗Xerox – Integrating Knowledge

It is in the fusion of the emerging digital networks and the rapidly developing knowledge tools and systems that the business knowledge revolution is being created. The immediate practical reason why knowledge management has risen to the top of the business agenda is not hard to ascertain: IBM estimates the amount of corporate data in the world doubles every 12 to 18 months and that only 15% of this is structured. The rest is digitised and stored, and remains unstructured (KnowledgeBusiness 2000). As the OECD perceptively comments "knowledge and information tend to be abundant; what is scarce is the capacity to use them in meaningful ways" (1996:11)

What is Driving Knowledge Management?

As Figure 1 illustrates the exponential increase in the production of data, information and knowledge and the increasing use of information and knowledge in business activity has created information overload with a rapid increase in the rate of obsolescence of data and information. There is a growing demand for easier and quicker access to relevant data and information, intelligently structured in ways that enable rapid knowledge acquisition and use. This is an illustration of supply-led demand where the increased power of computer processing, the developing bandwidth of networks, and the consequent rapid acceleration in the speed of business activity has stimulated a demand for better knowledge management.

The Knowledge Economy

The OECD defines the knowledge-based economy as one "directly based on the production, distribution and use of knowledge and information" (1996:2) This theme has rapidly been taken up by national governments as they realised the choice was either a national economy based on knowledge, technology, innovation and high value added, or an economy based on the competition of standardised commodities, low skills and poor wages. In the knowledge economy the basis of competitive advantage is the effective utilisation of knowledge resources. As the market value of companies intangible assets has come to far exceed the value attributed to physical assets, corporations also have eagerly identified with becoming more knowledge based in their people, products, services and markets.

The emergence of economies based on the production, distribution, and use of knowledge and information was charted by the OECD in their report *The Knowledge-Based Economy (1996)*: "The economy becomes a hierarchy of networks driven by the acceleration in the rate of change and the rate of learning. What is created is a network society, where the opportunity and capability to get access and join knowledge and learning intensive relations determines the socio-economic position of individuals and firms" (1996:14). This new economy has produced a growing knowledge intensity of goods and services, the famous weightless economy in Alan Greenspan, the Chairman of the Federal Reserve's phrase.

Knowledge as a resource causes great confusion for economists, as it is the only resource which increases with use rather than diminishing. Knowledge may be expensive to generate but there is little cost to diffusion. But this is knowledge in the abstract. As Joseph Stiglitz the chief economist of the World Bank (which is rapidly transforming itself into a knowledge bank) argues "It is the process of embodying knowledge in people (learning) and things (applications) that is costly in time and resources" (1999:9).

Processes of Knowledge Management

In this context the primary function of the enterprise is often assumed to be to create the conditions in which individuals can integrate specialist knowledge in order to produce goods and services of increasingly higher value. Implicit is the belief knowledge can be stored, measured and moved around the enterprise. But knowledge is a social construct that emerges through interaction and cannot be readily managed in the way of physical assets. The transformation of raw data into relevant information and then into shared meaningful and useful knowledge, according to Davenport and Prusak requires a sense of reciprocity, acknowledgement and a degree of altruism on the part of people (1998). For this to occur there needs to be a sense of trust and respect.

Nonaka and Takeuchi in their influential book *The Knowledge Creating Company* (1995) examine the process of the translation of tacit (subjective) knowledge into explicit (objective) knowledge which can be codified. A model of knowledge flow is based on the exchange of tacit knowledge within a community of practice. The transfer to other communities requires its explication, and subsequently the knowledge is internalised and made tacit again through application.

Knowledge produced and carried by individuals only reaches its full potential to create economic value when it is embodied in organisational routines, that is when it has been converted into organisational knowledge. This conversion is neither automatic nor easy.

Companies have a tendency to invest in information technology rather than in developing social relationships, and not many have attempted the cultural and organisational transformation needed to promote knowledge transmission and circulation. As Fahey and Prusak suggest, companies tend to emphasise knowledge stocks rather than flows (1998). Yet it is the dynamic process of knowledge generation and sharing that will determine the future success of companies.

Knowledge Management Strategies

Knowledge management initiatives are unlikely to be successful unless they are closely integrated with business strategy. Knowledge based resources and capabilities need to be utilised to develop superior products and services. "Identifying which knowledge based resources and capabilities are valuable, unique and inimitable and how these resources and capabilities support the firm's product and market positions are essential elements of knowledge strategy" (Zack 1999:3)

Knowledge strategy must be related to the core competency of the business. For example companies offering professional services use knowledge management to enhance their expertise. Similarly businesses based on the core competencies of innovation, content, relationships, branding and coordination can employ knowledge management to leverage their capability. This can be achieved through a personal approach providing better access to relevant background materials and pointing to experts for each subject within the organisation who can offer advice. Or a more codified approach can be adopted with greater technological infrastructure and support. Codified systems involve large databases equipped with search engines, connected through the Internet, Intranets and Extranets that allow people and companies to obtain quickly greatly enhanced knowledge. An evolution of knowledge management tools is possible from collecting information in data warehouses, through sharing information through document management, to leveraging knowledge through corporate portals that allow rapid access to essential intelligence.
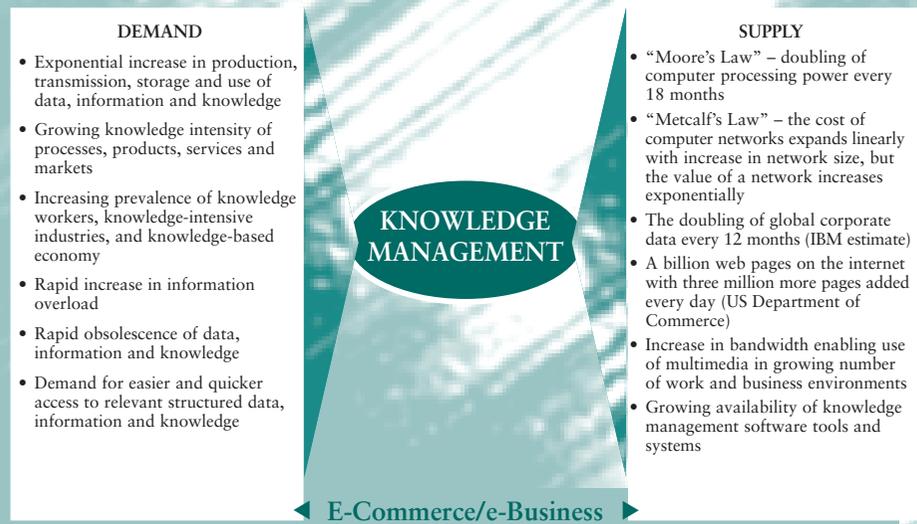
Technology platforms may assist, but no technology will stimulate the flow of knowledge without attention to the cultural and organisational context in which people are encouraged to develop and share their knowledge. Creating knowledge communities presents a challenge to business the results of which will determine corporate success in the new economy. ◆

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Figure 1:

What is Driving Knowledge Management?

DEMAND

- Exponential increase in production, transmission, storage and use of data, information and knowledge
- Growing knowledge intensity of processes, products, services and markets
- Increasing prevalence of knowledge workers, knowledge-intensive industries, and knowledge-based economy
- Rapid increase in information overload
- Rapid obsolescence of data, information and knowledge
- Demand for easier and quicker access to relevant structured data, information and knowledge

KNOWLEDGE MANAGEMENT

SUPPLY

- "Moore's Law" – doubling of computer processing power every 18 months
- "Metcalf's Law" – the cost of computer networks expands linearly with increase in network size, but the value of a network increases exponentially
- The doubling of global corporate data every 12 months (IBM estimate)
- A billion web pages on the internet with three million more pages added every day (US Department of Commerce)
- Increase in bandwidth enabling use of multimedia in growing number of work and business environments
- Growing availability of knowledge management software tools and systems

◄ **E-Commerce/e-Business** ►

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# THE ROCHE JAPAN SST PROJECT: "SUCCESS BREEDS SUCCESS"

HIROAKI SHIGETA

Chairman
Roche Japan

Roche Japan is an affiliate of the Swiss based multinational pharmaceutical group F. Hoffman La Roche. By the late 1990's, Roche Japan was experiencing declining sales of its premier pharmaceutical product (Product F) which had by then been on the market for more than 10 years.

From a peak of US$1.5 billion, sales dropped over 4 years to US$1.0 billion. Sales hit bottom in March of 1999, but from that point began to recover once again (see Chart 1 below).

Chart 1

Sales Trend of Product 'F' *(1995-2000)*
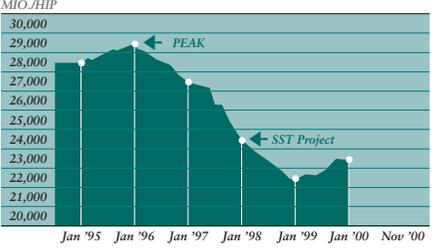
For a product experiencing spiraling declining sales in a declining market to recover suddenly would normally require added product applications, or a market led recovery. Neither applied in this case. A new corporate approach, now known as the Roche Japan SST Project was responsible for engineering this 'miracle'.

Faced with the task of improving the sales of existing products which had become stagnant and needing to prepare its medical representatives (MRs) for the launch of several new products, Hiroaki Shigeta, then President of Roche Japan, appointed a key marketing manager, Norio Nakajima, to assist him in developing the SST project. It was decided that to achieve the needed turnaround in sales, the average performance of Roche Japan's sales force had to be increased to the level of its highest performing MRs. This implied transferring the largely tacit knowledge of the highest performing MRs to the rest of the sales force. The acronym SST, standing for Super Skills Transfer, was chosen to reflect the need for a speedy turnaround – the connotation being with "supersonic transport". This is the story of the SST project.

Pre-Implementation Activities

A total of 24 high performing MRs were selected by the president and managers of the SST project to form a team designed to effect improvement in the 500 strong sales force. The decision to build such a team reflected our view that traditional MR sales support strategies were unlikely to produce the desired results. In the past, these had included having superior MRs accompany others on sales calls, regular training courses and production of a sales training manual. Competitors had tried similar approaches and offered special incentives, but had achieved at best only temporary improvements. A major goal of SST was that these effects were to be sustained indefinitely. We were also mindful of the 2:6:2 rule, i.e. in any sales organization the first '2' represents the top 20%, the last '2' the least productive 20% and the middle '6' represents the group average. Roche Japan's SST project was designed to borrow the strength of the top '2' and raise the threshold of the middle '6'.

Before starting the SST project, we first analyzed the gaps between the best and the average MRs. It was recognized that the company had disseminated the same knowledge and experiences equally to every MR. However, in terms of the 'output' (i.e. sales and profitability), a remarkable gap existed between the achievement of excellent and average MRs (see Chart 2 below). The activities of MRs were divided into 4 stages: acquisition of product knowledge; targeting major accounts, gaining access to clients and specific detailing or explanation of medical information. With respect to each stage, the difference in performance between excellent and average MRs was identified. In particular it was found that success in the 'access' stage, the 'black box' in the sales process, depended largely on MRs' personal skill and intuition. The key to improving sales performance was to extract this tacit knowledge from successful MRs and convert it into organizational knowledge.

Chart 2

Skill gap between Excellent MRs and Average MRs
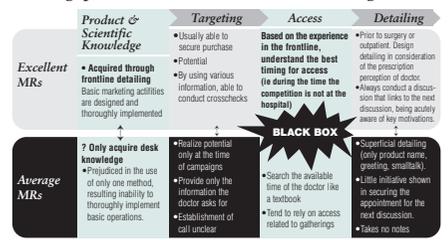
Project Implementation

Two months prior to the SST members going into the field, they undertook a training course at the home office. This involved giving the 24 members 'time' to develop their ideas and a 'place' to polish their knowledge. A group of 25 competent colleagues were chosen to assist them in this process. As part of the sales training, SST members discussed and refined sales call messages and methods of maximizing sales effectiveness. This process involved getting the members to think about the basic policy and methodology of the project by themselves. An important outcome of these discussions was a decision to replace the standard Sales Representative manual, as the SST members believed it did not express the skills to be transferred. They decided to create a new manual based on their own performances and best practices in the company. These were discussed, with members using metaphors and stories to illustrate their individual sales approaches. SST Project Leader, Nakajima facilitated the process by encouraging members to 'say it as it is' using informal methods of expression to help explicate their tacit knowledge. Two pilot studies were conducted during this period. After the sales training, SST members went into the field to work alongside other MRs for 3 month periods. A total of 5 cycles of 3 month periods proved necessary to complete the SST project.

The basic framework of SST was as follows:

- Three SST members became one team and were placed in a sales district.
- For three months, they each managed two MRs.
- Their activities were to accompany the MRs constantly.
- Accompanying MRs was done in units of weeks, and when the work with the first MR was completed, assignments were given, and during the next week, another MR was accompanied. When that was complete, once again the first MR was accompanied and it was verified that the given assignments had been accomplished.
- Since all of the MRs in a district could not be handled, MRs to be trained were selected in consideration of their ability to expand the effects to the rest of the district.
- SST members became like 'specialized tutors' and local managers took on the role of 'school teacher.' In other words, the SST member would improve the weak areas of the MR in a short period of time. Emphasis was placed on handling the customers that offered the most resistance or showed the least success. Similarly, instruction was related to the weakest products.
- SST members that accompanied MRs made their evaluation using peer to peer training.
- While accompanying, they did not make any complaints or criticism, but encouraged the MRs with positive remarks such as: "Try it!" "Go and tell them!" "You can do it!" They worked on the premise that if you don't praise people they won't act.
- Sales calls on doctors by MRs were carefully planned to ensure the doctors' specific needs were anticipated and addressed. This resulted in more effective sales promotional activities.

Project Results

The MRs involved in the SST project showed daily improvement. Later the SST project team members would look back and say that they were only enabling people to do the things they should be doing naturally. Product knowledge was polished and information gathering was diligently conducted. The sales call message was analyzed via role-playing, and the objective of the sales visit was clarified. The MRs that were accompanied by SST members said that their jobs were made even more interesting. This resulted in improved motivation – their jobs became more 'fun'.

Why did MRs start to think their jobs were more fun? We concluded that their attitudes were changed for the following reasons:

- They were able to develop and implement their own plans, conduct their own analyses, and evaluations. In other words, they grew into 'Knowledge MRs'.
- They learned better who was able and willing to support them and how to utilize the organization's resources.
- They understood the value of self-improvement.
- They enjoyed the fun of positive and natural competition with their colleagues.

The responsibility of the SST members was to teach the MRs how to use promotional materials effectively, by asking "Have you made a product file?" this confirms whether or not a file has been made to enable that MR to meet the scientific needs of the doctor. Prior to the introduction of SST, only 30% did this. After SST this increased to 80%. 'Carefully reading new promotional materials' increased from 10% prior to SST to 80% after its introduction.

... calls on doctors were carefully planned to ensure the doctors' specific needs were anticipated and addressed. This resulted in more effective sales promotional activities...

Analyzing the Results and Benefits of SST

We learned that the transplantation of skills and know-how of the top MRs to the average MRs is a time-consuming endeavor, but once it sets in it is something that will never go away. The MRs that were managed by SST members progressed very well and we experienced a domino effect on those colleagues who had not been accompanied. The 'Best Practices' developed by SST were later put into a database and made available for the use of all MRs. As a result, tacit knowledge was made explicit. Thus the spiral of tacit – explicit exchange was started - a process that we found led to constant improvement in the goals set by MRs.

The critical success factors of the SST project were:

■ **Human resource allocation**

Only consistently high performing MRs in the company were selected: 'the cream of the crop.' We decided that the MRs who were expanding their sales by virtue of strong personality alone should be excluded. Selected MRs had to be the type that could be easily emulated. They were natural teachers.

■ **Presidential control**

We found that if, for example, the Sales Director were allowed to select MRs and manage the SST project, the project's importance would reduce and the project would be taken as merely another sales effort. Under the direct management of the President, front-line information and opinions were more quickly absorbed, and removal of the departmental structure resulted in real time decisions and improvements.

■ **Follow-up**

While recognizing that sales follow-up is ultimately something that the Sales Branch Director or local manager will need to do, we also introduced a 'follow-up team' in the home office. MR growth has become something that both the home and local offices are involved in together. Follow-ups were continued for at least 6 months.

Although our initial objective was to improve sales by improving our sales staff, the SST project created a new atmosphere in the company. This program affected all of our MRs, even MRs that didn't participate in the SST project started to improve their performance because they observed the success of their colleagues.

District managers realized the SST approach was an effective way to increase sales in their district; so they also, through observation, adopted the coaching style of leadership as opposed to the high-pressure tactics previously used.

The **overall** ability of our sales force benefited by taking the unconventional step of removing successful sales staff from their districts and matching them up with other sales staff. Their positive actions spread like a fever through our company and the result was the achievement of sales targets across the board.

Possibly the most remarkable outcome of the project was the growth of SST members themselves. SST members were able to look at themselves from the viewpoints of others and to improve their own knowledge through discussing the sales manual with other members and answering the questions asked by younger MRs. Recapturing their own knowledge analytically in order to explain it to others led to them refining their tacit knowledge. They acquired the perspectives necessary to exceed what they used to be.

Where are we now?

The SST project created what we call a 'total business culture change'. This project aligned our company from the bottom to the top, creating a positive leadership and knowledge-based organization dedicated to providing our customers with the best possible service in the industry. (Our company motto is 'Best Value Provider').

In order to continue the momentum of the project, we developed what we call the 'SST Academy'. This extension of the SST project applies the concepts and policies established in the project as valuable training material for members of our staff that did not participate in the program. The SST Academy continues to train MRs with regard to positive coaching and proper follow up activities.

The incentive for our 24 SST members was their personal promotion. Realizing that these valuable employees have the ability to lead through knowledge, we placed them in strategic areas of the company with the hope that they will continue to inspire others and 'spread the fever' of success.

Best of all, we have developed a sales force that has proven capable of considerably boosting the sales of our existing products. We have equipped them to handle the new products on our horizon and to provide better service to our customers. ◆

From Knowledge Management to Knowledge Sharing

As management fashions go (and they do eventually go), Knowledge Management (KM) has done more than most to stimulate debate about the role and value of knowledge in organizations. Where companies used to focus on the mundane virtues of efficiency and control, KM has opened up an exciting new vista centred on the creation of knowledge and the pursuit of innovation. Bedazzled by this prospect, many organizations have invested large sums in KM initiatives, most of them involving major investments in IT systems such as groupware and Intranets.

A s the interest in KM has increased, however, so have the questions about its practical usefulness.[1] Companies are finding that their much vaunted systems to capture and stockpile knowledge are simply not producing positive returns. One typical example is a large European bank which sought to develop its own KM strategy.[2] The aim was that business customers anywhere in the world could access the bank's global knowledge-base. The strategy was to be implemented through the use of Intranet technology, connecting the bank's different business divisions across the world. When this ambitious aim was put into practice, however, the de-centralized nature of the bank meant that business units large and small were only too keen to develop their own Intranet systems, typically in complete isolation from developments elsewhere. At the last count, the bank's different divisions had developed over 150 Intranets – each one unique to a particular unit, and with no connection to divisions in the rest of the bank. Despite a massive investment in IT systems, the bank was if anything even less effective in managing the knowledge of its different divisions than it was at the beginning.

Cautionary tales like this abound, and are beginning to prompt a re-evaluation of the value of KM. Because 'knowledge' is such an elusive concept, it is very easy to confuse it with information flows and databases. On the face of it, databases and Intranets seem to break down the traditional barriers of time and distance, allowing knowledge to be transferred readily around the world. The reality, though, as many organizations are beginning to discover, is that knowledge is not as amenable to management as the traditional resources of capital, land and labour. This realization is reflected in our changing view of knowledge itself. Where a few years ago, pundits were happy to relate knowledge to data and information, we are now much more likely to see knowledge as something that emerges through learning and action. There has been a shift away from defining knowledge as a kind of complex code which we could ultimately decipher as long as we had enough crude information processing power. Now, writers are much more likely to define knowledge as a particular kind of experience – something we share with friends and colleagues through our informal social networks. Something which is communicated best not through the de-personalised imagery of the computer screen but through the highly personal medium of conversations and stories.

It has been said that computers can abolish distance, but cannot create intimacy[3]. This observation is particularly important when we consider the contexts in which we genuinely share knowledge with each other – older employees passing on the tricks of the trade to young apprentices, a football coach working with his team on the training ground to perfect tactics, R&D scientists working together to interpret the latest batch of results, and so on. These are all situations in which the exchange of knowledge depends on the relationships that exist between groups and individuals – levels of trust derived from friendship or perceived

competence, and a collective willingness to learn based on mutual respect and shared tasks. One way of summarizing the qualities that allow this kind of knowledge-sharing is the concept of 'social capital' – the informal networks which link one group and individual to another[4]. Studies of such networks present a very different picture of the way knowledge is communicated across an organization. IT networks provide a uniform set of linkages right across an organization. In contrast, social networks are more likely to be localized clusters of relationships, some strong, some weak, that may extend outside as much as inside the organization. And it is these social networks which continue to be the key factor shaping the exchange of knowledge. This applies even when information systems are deployed. Studies of email and groupware, for instance, show that patterns of use typically mirror existing social networks[5].

The implications of social capital for our approach to KM are profound. First, it suggests that we need to focus less on capturing and centralizing knowledge through IT, and much more on encouraging the kind of social networks that lubricate the flows of knowledge across and between organizations. An organization may develop a state-of-the-art Intranet and yet still discover that its underdeveloped social capital grossly limits knowledge sharing. Many of the companies which experienced BPR (Business Process Reengineering) in the last decade, for instance, often had cause to rue the loss of valuable capabilities associated with the delayering of middle management[6] – often this had less to do with an individual's expertise than with managers' ability to access vital knowledge through their informal networks. This loss of social capital is illustrated by a major pharmaceutical firm which underwent significant restructuring in the 1990's. This involved both the merger of businesses and the closure of some sites. At the end of this process, the company found that its R&D teams now interacted very largely amongst themselves and communicated little, if at all, with scientists at other company sites. This was despite the fact that scientists at different sites were actually confronting common problems in the area of immunology. Management also discovered that there was an additional risk factor attached to the erosion of social capital: while the company depended on external links to leading academics, the vast majority of these links were centred on a handful of individual scientists in R&D. The loss of even one of these individuals would have had damaging repercussions for the company's ability to access cutting-edge research. This highlights the role of social capital as the medium through which an organization's intellectual capital is created and accessed.

Recognition that a good part of a firm's knowledge-base actually resides in these implicit social webs of trust and reciprocity gives us a very different perspective on KM. For one, it suggests that managers need to give much greater attention to the hidden impact of change strategies on their organization's social capital. New IT systems cannot compensate for the loss of trust and social interaction resulting from an ill-judged corporate

restructuring programme. In addition, however, it points us towards the importance of the kind of management policies which rarely figure in KM initiatives. Human Resource Management (HRM) policies, or simply the way people are selected, rewarded and managed, have important long-term effects on the extent of knowledge-sharing within an organization[7]. Although social capital is something that emerges 'bottom-up' out of informal interaction – not something, therefore, which can be enforced in a top-down way – the HRM policies of the firm are crucial in shaping the environment for such interactions. An obvious example is the influence of payment and promotion systems. While the 1990's saw a major shift in HRM policies towards individual performance as the basis for pay, this was happening at the same time as a shift towards team-working which demanded greater knowledge-sharing amongst team members. As many organizations quickly realized, focusing too narrowly on the individual placed trust and collaboration within teams in great jeopardy – and with it the collective willingness to exchange ideas and experience which is critical to effective KM.

But, while a recognition of social capital tends to move the KM debate on from the design of an organization's IT systems to the evolution of its HRM practices, it also has more far-reaching implications which extend way beyond the organization itself. No firm is an island, and the competitive success of many firms actually depends on the trust and collaboration that they foster with suppliers, partners and customers. Of course, social capital at this level is not within the firm's control. It points instead to the wider culture and institutions of each society. It is not surprising, for example, to discover that many of the organizations which are cited as leading exponents of KM are Japanese companies. Thus the classic account of knowledge creation is based on a Japanese firm, where, as described by Ikujiro Nonaka, a knowledge spiral translates tacit knowledge into innovative products[8]. What is often forgotten in descriptions of the knowledge spiral is how far it depends on the sheer organizational dedication and collective team spirit which are characteristic features of large Japanese firms – and which depend (or depended) on the wider cultural norms and institutions of Japan. It is debateable whether the same willingness to share knowledge would be found in the more uncertain and individualistic environments found in some Western societies.

This link between organization and society is perhaps a final clue to the problems of managing knowledge. While many KM approaches seek to extract knowledge as a valuable resource for the organization, the importance of social capital represents a major barrier to the success of these technocratic initiatives. Simply increasing the supply of 'knowledge' through technological means does not guarantee that anyone will understand or act upon it. Rather, as I have described it, making knowledge work for the organization means addressing the way people actually work. And this seems comes down to some very basic but fundamental issues to do with the way those people interact, and the way they are managed and rewarded. Maybe the ultimate accolade for Knowledge Management's success will be the recognition that it is really not rocket science. It is actually something much more important – a vital part of management itself.

Simply increasing the supply of 'knowledge' through technological means does not guarantee that anyone will understand or act upon it.

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[1] A number of the examples used in this article draw on research carried out by members of the IKON (Innovation, Knowledge and Organizational Networks) research unit and funded by the UK's Economic and Social Research Council. The companies involved have been anonymized to preserve confidentiality.

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INCENTIVES FOR SHARING KNOWLEDGE

THE CASE OF THE WORLD BANK

THIS ARTICLE EXPLORES THE QUESTION OF INCENTIVES TO ENCOURAGE THE IMPLEMENTATION OF KNOWLEDGE MANAGEMENT. THE CONTEXT FOR THE DISCUSSION IS THE WORLD BANK, WHERE THE AUTHOR WAS RESPONSIBLE FOR LEADING THE INTRODUCTION OF ORGANIZATION-WIDE KNOWLEDGE MANAGEMENT FROM OCTOBER 1996 TO NOVEMBER 2000.

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BACKGROUND

In October 1996, Mr. James Wolfensohn, the President of the World Bank, announced at its Annual Meeting that the organization was going to become "a knowledge bank" and share its knowledge not only with staff but also with clients and partners and stakeholders around the world.

Less than three years later, the World Bank had taken a number of steps to make the change happen, including:

• The issuance of an explicit organizational **mission statement** for the World Bank which included sharing knowledge.

• The formalization of an explicit **strategy for sharing knowledge**.

• The establishment of an **organizational unit** to lead the change.

• The allocation of significant **budget** (3% of the organization's total administrative budget) for knowledge sharing.

• The nurturing of over a hundred knowledge sharing **communities** as vehicles for sharing knowledge.

• The provision of access to basic **information technology** (e-mail, the web) for all staff to share knowledge.

• The putting in place of a rudimentary system of **measurement** to assess the progress in implementing knowledge management.

• A decision on **incentives** to change the personnel evaluation system so that the annual personnel evaluation of every staff member included knowledge sharing and learning as one of the four "core behaviors" on which they were assessed every year.

The issue: staff surveys show a lack of incentives

It seemed to the World Bank management that the major elements for implementing knowledge sharing were already in place. But when surveys of staff were taken in February 1999 to assess the overall progress of the knowledge sharing program, it emerged that the greatest perceived obstacle to sharing knowledge was "lack of incentives". Close to 90% of staff surveyed indicated that "incentives were inadequate". The group coordinating knowledge sharing therefore decided to look more carefully at the question of incentives.

At that time, in April 1999, an external advisory panel had been assembled to evaluate the progress that had been made in implementing knowledge management and to suggest any necessary course corrections. The panel was led by Larry Prusak (IBM) and included other well-known experts in the field. One of the questions put to the panel was: what should be done about the issue of incentives which seemed to loom so large in the minds of staff?

The views of the external advisory panel

The advice received from the panel was interesting. In essence, the message was: "keep on doing what you are already doing, rather than something different or new."

In other words, the advisory panel was saying that the measures that the World Bank already had in place were the main elements needed to make knowledge sharing an integral part of the fabric of the organization. They felt that it was a question of having the patience and persistence to continue and reinforce those measures over a number of years.

In particular, the panel advised strongly against setting up any special incentive system in which staff would be rewarded in some additional way for individual acts of knowledge sharing. Several of the panel members said that their own organizations had experimented with such approaches and had found that they backfired badly. The reason, they said, was that once people saw that there was the possibility of getting a specific reward for sharing knowledge, such as enhanced personnel ratings or salary bonuses or points or whatever, then the dynamic quickly developed that staff would only share if they received specific rewards or incentives. Spontaneous sharing of knowledge then disappeared, as staff hoarded their knowledge until an occasion or situation arose when they were able to claim a reward. The effect of these reward systems was thus to create a disincentive to share knowledge – the opposite of what had been intended?

Why did staff say they lacked incentives?

In retrospect, it is interesting to go back and ask why staff within the organization seemed to feel so strongly about the lack of incentives, while the external advisory panel felt just as strongly that the measures then in place were appropriate. What was the cause of the apparent difference in perceptions?

One dimension of the discrepancy was simply that of timing. The surveys were taken in February 1999, that is to say, just before the first round of personnel evaluations were experienced in April-May 1999. At the time of writing (April 2001), several rounds of annual personnel evaluations have been conducted, and the issue of incentives appears to have receded somewhat in people's minds.

A second hypothesis that emerged in focus group discussions in 1999 was that staff were saying in the survey, not so much that they needed *more active and positive incentives*, but rather that there was a need to eliminate or alleviate the *disincentives* to share knowledge. Thus many staff still found themselves in units where the manager was not particularly encouraging of staff participation in the communities of practice, and put pressure on staff to do their work and meet deadlines so that there was in effect no time to share knowledge. In some cases, budget constraints and work pressures were such that even with the best will in the world, there was insufficient time for staff to participate in communities of practice. Care therefore needs to be taken that obvious disincentives to sharing knowledge are removed. This is a rather different issue from adding explicit incentives for knowledge sharing.

A third dimension relates to a possible misunderstanding of the economics of knowledge sharing. Most of the world's explicit economy operates on *the economics of transactions*. To sum it up in a crude caricature: "I own certain property and what's mine is mine. I will give you some of my property or services if you agree to compensate me with property or services that you have access to." The economy proceeds by way of such transactions, each of which has explicit compensation built in to any transfers.

By contrast, knowledge sharing and participation in communities or networks tend to operate on what is sometimes called *the gift economy*. To sum this up in another crude caricature: "I participate in a community, or share my knowledge with you, not on the expectation that you will instantly compensate me for my participation or sharing, but rather in the expectation that at some time in the future, sooner or later, I will receive something back from you or from the community and the prospect of this eventual return is what induces my continued interest in participation." It appears in retrospect that some of the World Bank staff were groping for something akin to a *transaction economy* when in fact we were in fact in the process of discovering what was involved in launching and operating a *gift economy*, an unfamiliar idea to many.

It is often suggested in organizations and in the press that it may be naïve to expect people to participate in such a gift economy and share ideas in organizations where knowledge is a source of personal power. A different take on the situation however is that over the last ten years or so, there has been a growing awareness in the business world and in organizations generally that hoarding knowledge does not always lead to enhanced power. It can, in fact, in many situations be very unintelligent, since the act of sharing often significantly increases the overall knowledge available to the sharer, usually without any accompanying disadvantage from sharing. The recognition that hoarding knowledge often isn't smart has led to a greater willingness in the knowledge domain to set aside the economics of transactions and to participate in a gift economy. This phenomenon has certainly been evident in the World Bank with widespread staff participation in over a hundred communities of practice.

When should personnel incentives be introduced?

In organizations that are starting to launch a knowledge management program, people often ask: when should an organization introduce personnel incentives for sharing knowledge? Should this be done at the outset? Or later in the process?

Opinions differ on this subject. Some experts argue that introducing incentives should be done on day one, in other words, at the very outset of launching knowledge sharing program, almost before anything else is done.

Others, including the author, take a different approach. They agree that changing the personnel system can send a very clear signal that the organization has "crossed the Rubicon" and that knowledge sharing has come to stay for good. But they also see dangers in trying to formalize incentives even before there is widespread understanding as to what behavior is in fact being encouraged or discouraged. If incentives are introduced before the desired behavior has materialized on a significant scale, the incentives can lead to misunderstanding and cynicism.

In the World Bank, a better result was probably obtained by making the change in the personnel system after several years of implementation had already taken place, when many communities of practice existed and when most people were becoming familiar with the idea of sharing knowledge and with communities. Even when it was introduced, there was still some cynicism and misunderstanding about the change being introduced, but much less than there would have been if an attempt had been made to introduce the change at the very outset?

What specific behavior should be rewarded?

In making changes in personnel systems and incentives, it is important to think through carefully what exactly is being rewarded. There is a danger here as in other areas that managers will succeed in generating the behavior they reward. It is vital that they be clear in their minds as what they are asking for.

For instance, organizations that have introduced incentives for staff to contribute knowledge objects to a knowledge repository have often found themselves deluged with an unstoppable flood of low-quality materials which are not particularly useful to the organization, and which create a huge new problem of cataloguing and sorting and evaluating and weeding.

Such organizations may find themselves with a large volume of information of variable quality on the subjects contributed, but little high-quality knowledge. Thus knowledge is a field "more" often turns out to be "less". There are dangers in relating incentives to quantitative measures unless quality is also built in. And there are risks in relating incentives to inputs or even outputs, rather than the actual outcomes that the organization desires.

What questions on incentives should an organization address?

By way of summarizing the main arguments of this article, the following are the questions that an organization introducing knowledge management should address:

1. What kind of incentives and accountability structures does the organization currently use?

2. What can be done about strengthening and reinforcing current incentives for sharing knowledge?

3. What can be done about removing or alleviating current disincentives for sharing knowledge?

4. Exactly what behaviors is the organization trying to encourage or discourage?

5. When should a change in the organization's incentive systems be made?

6. What can senior managers do to model the desired knowledge sharing behavior? ❖

INTEGRATED KNOWLEDGE AND PROCESS MANAGEMENT

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Abstract

*K*nowledge Management is nowadays widely accepted as an indispensable management discipline. However, it is often not linked to other prominent management approaches. This article suggests with a focus on modelling issues how Process and Knowledge Management can be interrelated. It then will be demonstrated how Knowledge Structure Diagrams can help to differentiate relevant knowledge more precisely. Knowledge Maps will be introduced in order to link knowledge to the resources of an organisation. Finally, the article will explain how knowledge can be captured alongside business process models. All these approaches support the establishment of a conceptual level of Knowledge Management. Such a conception of knowledge can be positioned between the well-discussed strategic Knowledge Management and widely available IT-solutions for Knowledge Management.

Knowledge Management as a Business Process

The Gartner Group defines Knowledge Management as "a business process for managing the enterprise's intellectual assets". In conformance with this definition, Knowledge Management should follow the main principles applied for Business Process Management. Such a process-oriented understanding adds a dynamic component to Knowledge Management. The typical knowledge process of identifying, creating, transferring, storing, (re)using, and unlearning can be described as a sequence of activities including many loops. The process owner is in this case a knowledge manager. Different variants of this process can be distinguished for different types of knowledge such as business, project or product-specific knowledge. A further variable that characterizes the structure of knowledge processes is the nature of knowledge (explicit or tacit) and how knowledge is stored (paper, digital, etc). Thus, knowledge processes could be seen in parallel to business processes (Figure 1). As long as Knowledge Management is not the core business of a company (eg consulting companies), knowledge processes can be compared to other support processes such as financial management or human resource management. On the one side, they are individual processes. On the

other side, they have many interactions with business processes as they can be regarded as an infrastructure for their execution.

Figure 1: Knowledge and Business Processes

"Having made costly errors by disregarding the importance of knowledge, many firms are now struggling to gain a better understanding of what they know, what they need to know, and what to do about it".

This statement from Thomas Davenport stresses the need for an improved documentation of knowledge. From a variety of issues that could possibly be discussed regarding the interrelation between Knowledge Management and Process Management, this article focuses on how knowledge can be modelled. Consequently, this paper tries to contribute to a more transparent way of managing knowledge.

It will be shown with examples

- how knowledge can be structured,
- how Knowledge Maps can capture the distribution of knowledge, and
- how knowledge within business processes can be depicted.

All examples are designed with the modelling suite ARIS-Toolset from IDS Scheer AG (IDS 2001).

Knowledge Structure Diagram

In order to manage knowledge effectively we must first understand its structure. Similar to the hierarchical structure of organisational charts, Function Decomposition Diagrams or many system analysis techniques, knowledge can be structured into a hierarchy of interrelated knowledge objects. A knowledge object is a symbol in a conceptual model that represents relevant knowledge. As such, it can be compared to an entity type in a data model or to a function type in a process model. A knowledge object has attributes that characterize knowledge further into knowledge types such as business, product or technical knowledge, explicit or tacit knowledge, or declarative or procedural knowledge. Knowledge objects can have interrelations with each other (e.g. 'is part of', 'is a'). Furthermore, knowledge objects have not only static attributes, but also behavior. This part of a knowledge object specifies the activities of the knowledge lifecycle applied to this object. This includes identification, creation, transfer, storage, (re)use and deletion of this knowledge.

Figure 2 shows as an example how general customer knowledge can be broken down into more specific knowledge components. On a lower level, other object types such as applications or folders can be linked to

knowledge objects in order to document, for example, how and where the individual knowledge is stored. Furthermore, different colors can be used to differentiate between explicit and tacit knowledge. Knowledge Structure Diagrams can serve as the conceptual basis for knowledge repositories.
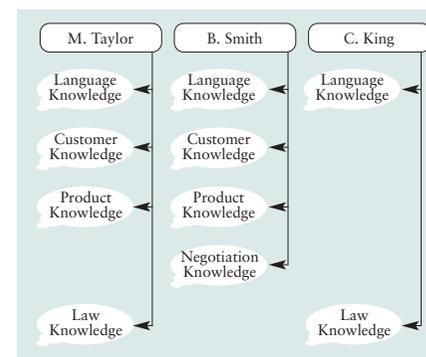
Figure 2: Knowledge Structure Diagram
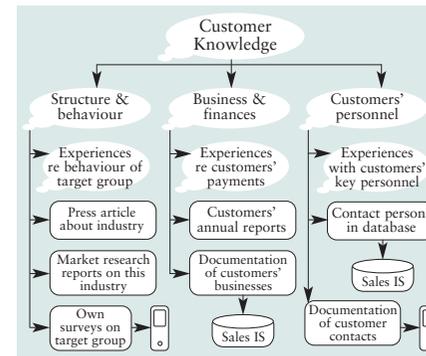
Knowledge Map

A Knowledge Map links the knowledge objects (see Figure 2) to organisational constructs. In the form of a matrix, these maps depict relevant types of knowledge in rows. Each column represents an organisational unit, a position or on the highest level of detail individual employees and involved external persons. In addition to organizational constructs, this can theoretically also be other resources that possess or store knowledge (eg Intranet). Figure 3 refers to the Knowledge Structure Diagram in Figure 2 and indicates what employee possesses customer knowledge. The small symbol assigned to 'Customer knowledge' shows that a more detailed specification of this type of knowledge exists (see Figure 2). Knowledge Maps are applicable for knowledge that can be clearly assigned to resources or organizational units. Knowledge Maps are useful instruments to evaluate the coverage and distribution of required knowledge. Moreover, they facilitate an analysis of the consequences of organisational changes from the viewpoint of Knowledge Management.

Figure 3: Knowledge Map

Modelling Knowledge in Business Processes

Knowledge Structure Diagrams and Knowledge Maps are rather static approaches to capture knowledge and its distribution within the organisation. The true integration of Process and Knowledge Management takes places when knowledge is considered in the business process design. This requires adding knowledge objects to business process models (Scheer, 1998). Knowledge can have different types of relationships with the activities of a process. In the most cases, knowledge related to an activity represents the knowledge that is required to execute this activity. In the other direction, knowledge related to an activity can also represent the type of knowledge that is gained through the execution of an activity (eg knowledge about a customer). Figure 4 shows a simple example that completes the previous figures. In this case, two types of knowledge, Spanish and law skills, are required to perform the task 'Convey export check'. As shown in Figure 3, C. King is an employee with the required knowledge.

Figure 4: Knowledge in Business Process Models
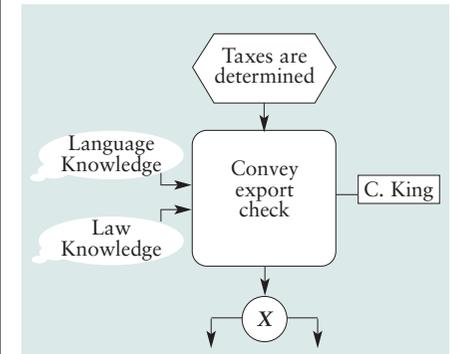
In this final part of this article, Enterprise Systems such as the mySAP applications will be taken as an example in order to discuss how knowledge relevant for Enterprise Systems can be modelled. These comprehensive applications are often documented in reference process models that describe on different levels of abstraction the main processes supported by the Enterprise System. In order to develop a list of the required areas of knowledge for the management of Enterprise Systems, an intensive literature review was conducted (Rosemann and Chan, 2000). From the meta-case studies of the literature reviewed, six types of knowledge could clearly be identified and distilled for the successful management of Enterprise Systems. These types of knowledge are:

- Business knowledge
- Technical knowledge
- Product knowledge
- Company-specific knowledge
- Project knowledge
- Communication, coordination, and cooperation knowledge

These types of knowledge can be further detailed in Knowledge Structure Diagrams. Knowledge Maps

can help to describe how this knowledge is distributed within a company.

Reference models extended with information about the required knowledge are seen as an appropriate medium to support the objectives of Knowledge Management for Enterprise Systems. The proposal is to group knowledge objects into the six types above and add them to functions in Enterprise Systems reference models. Following the Enterprise System lifecycle (Rosemann 2000) the knowledge objects are identified by an index, which can be S (System Selection), I (Implementation), E (Execution) or C (Change). An 'I' indicates that knowledge about the configuration of the product and/or the process is necessary. This information is only of importance during the implementation stage. It helps to identify for a process, which knowledge the responsible project team has to have. After the configuration of this process the knowledge, which is necessary to perform the activities of a process ('E') as well as change management knowledge ('C') becomes relevant.

Figure 5: Extended Reference Process Model (below)

The classification of tacit knowledge objects in Figure 5 serves as an indication at which activity tacit knowledge is required. As such, an employee performing a task that requires tacit knowledge will have to rely on his/her past experience/cognition. For example, in the above process an employee needs tacit knowledge when a customer complains about a mistakenly issued reminder notice. The employee needs to apply his/her knowledge of the customer and has to be able to identify if the customer has been a long time loyal customer, if the customer has a sizable account standing with the organization, etc. The employee may need to over-ride certain procedures and protocols to treat an important customer differently.

In addition to the lifecycle phase and the differentiation into explicit and tacit knowledge, every knowledge object can also be classified by the knowledge type. As discussed above this can be business, technical, project, product, company-specific or communication/cooperation/coordination knowledge. Such extended reference process models can be used for the following purposes:

• A *vendor* of an Enterprise System might offer these comprehensive models to provide customers with

Knowledge Management relevant information. This would allow involved consultants and customers to evaluate how difficult the implementation of the process will be based on the required knowledge.

• An *implementation partner* can use these models as a starting point for the own Knowledge Management. Documents from various projects could be added, making it possible to access relevant knowledge. A typical query could be: How is the process usually configured in a certain industry?

• Finally, a *company* that wants to implement an Enterprise System gets important information about what kind of knowledge is required in which process. This reduces the information asymmetry between consultants and customers. For every relevant process, the necessary knowledge for system configuration and the corresponding organisational and IT changes can be easily identified. This provides information for the selection of staff members to be involved in the project. The models can be continuously extended with enterprise-individual documents and store all knowledge materials related to the business processes.

Treating Knowledge Management as a form of Business Process Management allows reusing established methodologies, which are widely used in Process Reengineering projects. This article focuses on applying simple modelling principles for Knowledge Management. With such an approach, the interrelations between knowledge and business processes become clearer. ◆

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Figure 5: Extended Reference Process Model

MANAGING KNOWLEDGE AT A DISTANCE

Knowledge management and electronic learning tools in the UK Open University MBA

The "knowledge economy" is an emerging global system driven by decreasing transaction costs delivered by information and communication technologies (ICTs), it requires working practices involving close collaboration across increasing distances. These distances can be both physical and cultural. Divergent nations and regions are becoming increasingly inter-linked within networked and globalised organisations and alliances. Increasing complexity and specialisation require knowledge intensive operations to utilise virtual forms of co-location to achieve a critical mass of intellectual and physical resources. ICTs are used to enforce uniformity of practice across cultures, or to engender a sense of non-locational "place" among physically separated employees, but this shift requires close alignment to a variety of local business practices rather than to any convergent "global culture".

Business is discovering new forms of collaboration and inventing new forms of enterprise through interacting electronically on an increasing scale, and business education is moving to anticipate the consequent demands on graduates. The student learning experience must focus on critical exploration and the generation of new and relevant knowledge in a dynamic environment. The Open University Business School (OUBS) is one major provider of business education which is shifting to an interactive model of distance learning in response to the unfolding global environment[i].

The OUBS was established in 1983 as part of the UK Open University founded in 1969. OUBS now has some 25,000 students across 38 nations with around 250 permanent staff and 850 part-time tutors. There are 7,000 participants in the MBA program launched in 1989, 2,500 based outside the United Kingdom. In 1999 a new second stage elective was launched. B823 Managing Knowledge consists of thirteen units occupying one week of study each[ii]. The breadth of the course reflects the multidisciplinary development team headed by Paul Quintas, Britain's first Professor of Knowledge

Management. Units deal with communication, the cost and value of knowledge, and the process of knowledge management within and between organisations. Intellectual capital and its measurement are examined, along with intellectual property rights, and innovation. The nature of tacit and explicit knowledge and their relationship is a central concern. OUBS students are themselves practising managers in public, private, not-for-profit and profit organisations and contribute their diverse experience to the learning environment.

B823 uses established and state-of-the-art knowledge technologies as part of a distance learning environment. The OU developed a mass delivery model for a highly developed product. Radio and television broadcasts fronted purpose-designed print and audio media while individual study was leavened with face-to-face activities in tutorial groups and at residential schools. Students engage with the materials at a time and place of their choosing, rather than learning synchronously in a face to face environment. This asynchronicity is implicit in distance learning, but the electronic support of asynchronous communication is playing an increasing role at the OU. The information and communication technologies that have facilitated the globalisation of the world economy provide asynchronous electronic support to students through the FirstClass computer conferencing software adopted across the Open University.

Since 1991, the OUBS has been developing the use of computer-mediated communication (CMC) in MBA courses. General interest conferences were provided on a voluntary basis. Currently each student has an account with a dedicated conference for their tutorial group and tutor. Other conferences deal with administrative matters, course concepts, course team announcements, and social discussions related to individual courses and programs. The academics' role has developed from passive monitoring of these conferences to more interactive facilitation. Distinctive e-monitoring skills were identified through action research and a 5-step model was developed by Dr Gilly Salmon. This provides a framework for the monitors (in OUBS the associate lecturers acting as tutors) to identify the development of an effective on-line community among their students. The model is also a resource for the development of the skills appropriate to other contexts and is summarised below[iii].

The Model

Stage one:

Access and Motivation

Individual access and the ability of participants to use online learning tools are essential prerequisites for participation in online learning. At this stage an understanding of the difference between one-to-one e-mail and conferencing is developed. This requires a welcoming and encouraging environment. Moderators monitor and comment on student efforts, providing "handholding" where necessary.

Stage two:

On-line Socialisation

Individual participants establish their online identities and find others with whom to interact. Understanding of the protocols and etiquette of communication is

developed. From stage two onwards, content becomes important. Online activities must encourage participants to engage in active learning through meaningful and authentic learning tasks.

Stage three:

Information Exchange

Participants share information relevant to the course. Up to and including stage three co-operation occurs, i.e. support for each person's goals, but the growing engagement of participants dramatically increases the volume of information. Moderators guide the students through the material they must select from, and help them develop appropriate strategies for information management.

Stage four:

Knowledge Construction

Course-related group discussions occur and the interaction becomes more collaborative. The communication depends on the establishment of common understandings. Focus shifts from information content to knowledge process. Students are encouraged to be more technically independent and to engage questions which have no "right" or "proper" answers.

Stage five:

Development

Participants look for benefits from the system to help them achieve personal goals, explore how to integrate CMC into other forms of learning and reflect on learning processes. Participants become responsible for their own learning and need little further direct support. The moderator's role is usually stimulating debate, challenging assumptions and promoting discussion of course related issues[iv].

Asynchronous and Synchronous Learning Support

As the delivery of courses becomes more interactive, a role for intensive, real-time discussions has been identified. An electronic means of sharing visual representations for discussion and annotation, as flipcharts and OHPs are used in a face-to-face tutorial has been developed.

In the presentation B823, *FirstClass* is supplemented with *Lyceum*, a synchronous internet-based tool developed by the Knowledge Media Institute (KMI) at the Open University. This delivers audio communication and a shared graphic workspace via a single connection. It provides on-line meetings and tutorials, with groups able to create separate "rooms" during a session. This allows a mix of break-out activities and plenary discussion, as with face-to-face meetings. Materials for discussion, such as diagrams or images are distributed to tutors via *FirstClass* email, and loaded into *Lyceum* for the session. The screen-grabber can capture images from anywhere on the Internet. Sketches and diagrams representing the outcome of a discussion can be captured and archived by the participants.

Lyceum represents the new technologies available for the support of knowledge-based organisations and

provides students with experiential learning opportunities. Several commercial applications offer some of the facilities of Lyceum, but its precise combination of features reflects OU practice and priorities.

The B823 Course team works with two complementary forms of electronic support for learning. The synchronous *Lyceum* mode and the asynchronous *FirstClass* mode overlap because both applications include a synchronous text-chat option. This allows exchange of typed messages in real time. The 5-step model is applicable to both synchronous and asynchronous support for learning. During the first presentation of B823 the use of Lyceum was monitored formally[v]. The discussions and interactions in both media generated material of value to subsequent learners. *FirstClass* conferences are archived during course presentations, but the course team is looking to standard web technology to develop a more widely accessible shared resource. This approach was first explored in a research environment.

"Virtual Journeys": learning paths and memory tracks

In August 2000 the Odyssey Group of organisational researchers piloted Lyceum in a research context, by using it to provide "electronic adjacency" to a distributed team of researchers, an academic variant of the "virtual" or "distributed" organisation. The group is interested in the impact of CMC on organisational development and on the locational logic of organisations.

The group had developed the notion of a "Virtual Journey" as a means of accessing experience without co-presence. A web page (or small set of pages) containing images gathered during a journey is constructed with links to relevant web-sites discovered either on route or subsequently[vi].

Journeys can be physical and/or intellectual. Key aspects of an environment or a pathway through an environment are captured, allowing virtual participation in workshops and discussion asynchronously. The use of evocative images with links to existing web-based resources transforms a simple medium into a rich tool for surfacing aspects of implicit knowledge within a community of practice. Other participants can follow and add to the trail, arriving at their own evaluation of a (virtually) shared learning experience. Lyceum was used to provide synchronous interaction and discussion between participants within the U.K. and in the Northern Territory, refining and developing one of several journeys developed during the workshop.

Learning and Practice

The addition of web-based resources to the learning support repertoire of the OUBS allows a form of "course memory" to complement the on-line conferences and provide a resource that can be developed by successive cohorts of learners. Such resources are equally relevant for high technology manufacturing, or sophisticated service organisations where the tacit knowledge created through experiential learning needs to be captured and shared across a distributed community of practice.

Moving into a new century, the OUBS is finding a convergence between its practices as an institution of

learning and those of the "learning organisations" developing in response to the new, global business environment. The Open University as a whole is experiencing a shift from its original one-to-many model of delivery to a much more interactive and flexible framework. This reflects the experience of many business enterprises and administrative organisations dealing with a dynamic networked environment. The electronically supported distance learning environment is also a paradigm of the emerging networked organisation or network enterprise[vii] that may, through extension to alumni, allow closer alignment between business research, learning and practice. ❖

Acknowledgement: Dr. Gilly Salmon for permission to include her work on electronic mentoring.

Stephen Little is course team chair for the presentation of B823 Managing Knowledge, and Senior Lecture in Knowledge Management at the Open University Business School.

Notes:

i   See the discussion at http://oubs.open.ac.uk/businesscafe.

ii For an overview of this MBA program see http://oubs.open.ac.uk/

iii For details see Salmon, G., (2000). Computer Mediated Conferencing for Management Learning at the Open University. Management Learning 31 (4) 491-502 and Salmon, G., (2000). E-moderating: the key to teaching and learning online. London: Kogan Page.

iv See also http://oubs.open.ac.uk/e-moderating

v   The background to Lyceum is available at http://kmi.open.ac.uk/people/sbs/talks/Lyceum-CMC-18iv00/. The technical report on Lyceum and B823 is available at http://kmi.open.ac.uk/publications/techre-ports.html/

vi Lyceum and the Odyssey workshop is discussed at http://www.geocities.com/the_odyssey_group/lyceum.html. "Virtual journeys" can be seen at http://www.geocities.com/stephen_e_little/vjourney.html.

vii See the definition of a "networked enterprise" in Castells (1996) The Rise of the Network Society, Oxford, Blackwells.

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TOWARDS K-GOVERNMENT

These days we can scarcely avoid hearing about the knowledge economy and knowledge management. We also hear a lot about e-commerce and e-government. However, we don't hear much about (information-based) i-government and virtually nothing about (knowledge-based) k-government. In this article I'll be discussing how the nature and processes of government may be adapting to the information age.

My thesis is that government systems are economically important repositories of knowledge assets and social capital. Hence, they ought to be treated as such. By applying the principles of learning systems to the design of the machinery of government, the learning process can be enhanced and the knowledge capital can be better managed. In my discussion I'll draw some lessons from the New Zealand experience over the last decade.

We undertook some radical reforms, made useful gains, but also made significant mistakes.

Predicting, Learning, Knowing

Clearly, the information revolution is unleashing very strong social forces. These forces are impacting at all levels – on individuals, nations and the international community. Their impacts are reflected in changes to the structures and functions of governments. It is a time of radical change and there has been no shortage of forecasts about outcomes. Over the last few years, for example, we have had predictions of the end of the nation state (GuÈhenno), the clash of civilisations (Huntington), the end of history (Fukuyama) and the emergence of the sovereign individual (Davidson and Rees-Mogg).

Predicting the future is something of an adventure for heroes. Hindsight may confound our predictions, do violence to our reputations and – more painfully – ignite great hilarity in our colleagues. Prophets do need to be made of tough stuff! One of my favourite quotations belongs to a namesake of mine. Ken Olson was the founder of the Digital Equipment Corporation and one of the leading hotshots of the computer world. In 1977 he made the following immortal statement: *"There is no reason anyone would want a computer in their home"*. Sic transit gloria mundi.

But we should be kind to gloriously-wrong predictions, because we are all gallant predictors who sometimes gallantly fail. In fact, we make predictions literally from moment to moment. The human mind is an information-gathering, remembering, hypothesis-forming, future-predicting machine. We have evolved these abilities because using them increases our chances of survival. The organisms and organisations least likely to survive are those that have stopped learning and adapting.

Learning Systems

Many complex systems can learn – or at least, manifest internal changes that are analogous to learning. A system that has such a capability is called a "complex adaptive system" (CAS). Exactly how CAS learning happens is currently the subject of considerable study in research centres such as the Santa Fe Institute. The problem is being addressed across a broad front and in a range of disciplines.

One interesting method – a ground-up approach – uses extremely simple independent agents known as cellular automata. These virtual creatures are simulated in a computer and can be made individually to manifest simple behaviours. However, even when the behaviours individually are simple, the systemic behaviour of a population can be extremely complex and almost impossible to predict. This alone shows us that we still have much to discover.

Research into CAS behaviour is making exciting progress. I don't wish to imply that it has yet produced anything like a comprehensive understanding of CAS learning. That achievement may be decades away. However, some of the main elements seem clear enough. In order to "learn" – in the sense that the term is generally understood – the CAS must have the ability to:

- sense environmental conditions;
- remember what it senses;
- prefer some environmental conditions over others (else why learn and adapt);
- compare different remembered environmental conditions to identify elements of similarity and similarities of sequence;
- infer sequential relationships; and
- "encode" those inferences through some form of internal adaptation.

Learning Government Systems

The concept of systems learning has been applied to organisations and companies. It achieved a measure of general acceptance following the publication of Peter Senge's popular book *The Fifth Discipline*. The same concept can also be applied to government systems. By this, I mean government systems as a whole, rather than individual government departments and State organisations, although the latter is also true.

Myopic Democracy

One of the problems of democracy as a form of government is that particular governments are apt to change more frequently than happens with other forms. In his masterwork *The History of Government*, Samuel Finer used a typology of government regimes and polities that included:

- the Palace;
- the Church;
- the Nobility; and
- the Forum.

Each was typified by characteristic behaviours and political processes. Whereas the Palace is authoritarian and engenders secrecy, intrigue and favouritism, the Forum (of which modern democratic governments are an example) is populist and characterised by openness and the need to solicit ongoing support. When the direction of popular support changes, the government changes. This does not necessarily mean that the elected representatives change. For example, in New Zealand under the MMP system, governments can change (and have changed) both in composition and policy orientation as a result of a realignment of minority party affiliations.

The main consequence is that democratic governments are often short-lived and innately shortsighted. Officials and politicians may learn as individuals, and departments may learn as organisations, but if a government system is to be managed as a CAS, the learning must impact on the system as a whole. And systemic learning must be reinforced at each stage of the learning process – sensing the social and economic environment, enabling systemic memory, researching and inferring causality and encoding the conclusions in the form of improved knowledge assets and smarter, more efficient systems.

The systemic learning process may be concentrated on the formal organs of government, but cannot escape also impacting on constitutional issues and the familiar political feedback mechanisms. These latter include the media, opinion polling, political spin doctoring and voters' day-to-day experience of life and of using government services. If systemic learning can be embedded more permanently, the myopia of democracy may be mitigated.

The New Zealand Experience

In the latter part of the 1980s, at a time of fiscal crisis, New Zealand embarked on some radical reforms. They affected the economy in general and government systems in particular. Government departments and their accountability systems were restructured along the lines of private sector companies. Ministers notionally "purchased" outputs (services and goods) from their departments. The departments acted as producers and suppliers and were free to choose their inputs on the basis of economic efficiency rather than central control.

The theoretical underpinning of these reforms came from the economics of public choice, the theory of the firm and agency theory. Keynes once made a quip that even the most practical man of affairs is usually in the thrall of the ideas of some long dead economist. In this case it was untrue. The economists whose ideas held thrall were still living. Perhaps it wasn't a good omen.

If the main objectives of the reforms were to improve the economy and decrease the cost of government services, those objectives arguably were achieved. But the government *system* also did some learning, Some of it was positive, some of it wasn't.

On the positive side, departments markedly improved their management information systems and public servants individually improved their management skills. Prior to 1989, there were few accountants or other management professionals working in the public sector. All that has changed. Many managers now have responsibility for large cost centres and generally understand money and cost-efficiency much better than they did. Some are even more skilled than their private sector counterparts. Other professional skills, such as computing, contracting, human resource management and industrial relations, were also relatively rare in 1989. Now they are commonplace.

On the negative side, the New Zealand reforms placed too much emphasis on cost efficiency in producing outputs. They did not place enough emphasis on outcomes, output quality, organisational and systemic capability, or risk mitigation. As a result, departments can now produce prescribed outputs at lower cost but – in the view of many – are materially weakened in their ability to innovate, adapt and adjust to demand or supply shocks.

The prevailing idea that departments were responsible for outputs and Ministers for outcomes helped create very serious deficiencies in systemic information. Little work has been done in the last decade to measure changing social conditions or to evaluate the impact – beneficial or otherwise – of government interventions. In addition, because departmental information systems were developed to comply with conventional accounting requirements (GAAP), the steady loss of intangible assets such as capability remained invisible in departmental accounts. It was not detected until it became visible operationally.

Another consequence was that chief executives became narrowly focused on the task of producing the outputs required of their departments. The departments became isolated silos. Inter-departmental co-operation suffered.

The lack of relevant research and evaluation, the weakening of organisational capability and the erosion of interdepartmental co-operation have all been widely recognised. The Audit Office was among the first to detect them and the Controller and Auditor-General reported on them to Parliament in 1999. However, the problems are proving difficult to wind back. This is ironic when viewed from the current climate of commercial accountability. There is an increasing acceptance by the private sector of wider measures of performance reporting than are legally required of the New Zealand public sector. Good examples are found in triple bottom line reporting and the concept of social capital, subjects that were traversed in excellent articles in the November 2000 edition of B-HERT News. Had such views been more widespread in the late eighties, the New Zealand reforms might have proceeded differently and the present problems could have been avoided.

From E-Government to I-Government to K-Government

Most western governments have adopted strategies for benefiting from the efficiencies available from computer processing and electronic communication. However, many *e-government* strategies are in their initial stages and are concentrating on setting up the infrastructure that enables these efficiencies to be realised.

I believe the future holds much more. The next step from *e-government* is *i-government*. Intelligently-designed systems can capture valuable transaction-level information. Government departments can then co-ordinate the provision of services and customise those services to the needs of individual citizens. Better still, the systems can be made to learn – about needs, preferences, processes, impacts and causalities. The information that the systems generate can also be used to simulate the effects of policies (usually preferable to using citizens as crash test dummies) and to predict social outcomes with an improved degree of reliability.

In the gallant spirit of Ken Olson, I will venture a prediction. A further step beyond *i-government*, I suggest, will be the widespread emergence of *K-government*. It will involve – at a political level – the conscious construction and management of whole-of-government systems as complex adaptive systems. It will happen because:

- Better accounting for intangible assets will make very clear both the enormous value of governmental knowledge assets and the public benefits that flow from managing them properly;

- As our understanding of complex adaptive systems improves, we'll become confident that we have the ability to do it; and

- We'll come to understand that – as exemplified by the New Zealand experience – government systems will always be learning and adapting, for good or ill and whether we want them to or not. For our own good, we'd better take control of the process.

K-government will embrace almost all citizen-government interactions and will generate many innovations. Some will manifest as profound constitutional changes, such as re-definitions of sovereignty and citizenship, the

development of new policies and the emergence of virtual electorates (the last of these having already been started by South Australia).

K-government will also help governments meet the challenges posed by the information age. One important challenge is already evident – preventing national tax bases from disappearing into cyberspace. However, I believe the more important challenges will be international and cultural. Huntington, who predicted a clash of civilisations, refers to seven – Western, Slavic-Orthodox, Japanese, Islamic, Confucian, Latin American and African. Not all are pursuing information age benefits with equal energy. Not all will be equally successful. The differences will exacerbate economic disparities. It will not be easy (or wise) for the more successful to isolate themselves in the enjoyment of their relative wealth. We'll need national and international government systems that are smart enough to get along with each other. That would indeed be a step forward. They've never been that smart before. ◆

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[1] The views expressed in this article are those of the author and are not intended to represent those of any other individual or organisation.

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REPORT ON ENTREPRENEURIAL AUSTRALIA : FUTURE AUSTRALIA

Entrepreneurial Australia : Future Australia, (held on 30/31 May at the Park Hyatt – Melb), was a milestone event. It brought together an outstanding collection of leaders, opinion makers, entrepreneurs, activists in government, education, research and business - all contributing in the discussions about how to build positive attitudes to entrepreneurship and support for a culture of creativity and innovation in Australian society.

We have received many expressions of thanks and congratulations from delegates. By all accounts, the Event achieved one of its primary purposes – establishing a community of leaders who are putting in place the changes needed for Australia to become a nation of Entrepreneurs.

The Event was successful in many other ways as well, attracting more than 150 participants as well as 45 panellists and guest speakers. The diversity and geographic spread of delegates ensured a vibrant and stimulating environment for the sharing of experiences. Presentations from panellists and guest speakers were all of an excellent standard and stimulated discussion during the many opportunities provided for networking.

From responses to the feedback survey, everyone saw the networking opportunities as valuable while every second person claims to have identified future business opportunities. And while these may have been secondary aims of the event, the most important result was everyone indicating their interest to participate in future activities!

Highlights of the event included:

• Dr Jim Fox from Vision Systems - giving his address live from London via a video conference hook-up.

His commitment to be part of the event was matched by his well thought out list of actions that we all need to pursue.

• The quality and variety of the panellists ensured each topic was well fleshed out, while the questions and comments from the audience demonstrated passion and understanding for the issues.

• Addresses by two ministers, Dr David Kemp (Federal) and John Brumby (Victorian), showed clear, bipartisan support from governments for entrepreneurship and the development of an entrepreneurial culture.

• Guest presentations from George Lewin, who recounted his own inspiring story of the successful commercialisation of an invention and his vision for a foundation to assist new inventors, and from Shell Australia's, John Simpson, who outlined the Shell sponsored Livewire program.

• "Backing Australia's Entrepreneurs" Gala Dinner – an entertaining and enjoyable evening hosted by Senator Nick Minchin, where a number of Australia's young Entrepreneurial Hero's were presented and celebrated.

• The mix of entertainment and activities to break up the days, add some excitement and stimulate networking opportunities.

The entire event was recorded on video so that everyone's contribution could be captured and a comprehensive proceedings paper developed. In this report, the many proposals for further action will be presented, including those that B-HERT can pursue.

If there was one criticism of the event, it was that so little media coverage was obtained. While every effort was taken to introduce the media to the many issues being discussed, it was clear from reports this week that the One.Tel has provided the media with anti-entrepreneur material once again.

However, this negative spin on very un-entrepreneurial businessmen can be turned into an advantage as it opens the door to argue the case that entrepreneurs are not "blind optimists" but in fact they are great evaluators of opportunity, superb planners, and excellent managers. As Professor Kevin Hindle of the Australian Graduate School of Entrepreneurship wrote, "they are particularly good at risk management. They use these skills to turn innovations into new businesses. In fact none of these attributes apply to the One.Tel case. The business was not innovative. It was clearly not well managed. Most importantly, management seems to have been more attracted by risk taking than risk management."

The virtual community created by the Entrepreneurial Australia : Future Australia Event contains the leaders and enthusiasts needed to progress the outcomes and B-HERT is uniquely positioned to take on the role of facilitator to keep the momentum going. ◆

GOVERNMENT SUPPORTS AWARDS

B-HERT is delighted to announce for the third successive year that the major sponsor of the 2001 Awards is AusIndustry and the Industry Research and (IR&D) Board.

The IR&D Board is an independent statutory body whose purpose is to administer specific Federal Government programs in support of industry-based innovation, and to provide advice to government on national industry-based R&D strategies and priorities. Its broad mission is to increase the level and commercial success of industry-based R&D in Australia.

AusIndustry, the Federal Government's program delivery agency, aims to encourage research and development and innovation within Australia.

See the following pages for details on the 2001 Awards.

2001 *AWARDS*

Al-industry

B-HERT IS DELIGHTED TO ANNOUNCE THE 2001 AWARDS FOR OUTSTANDING ACHIEVEMENT IN COLLABORATIVE R&D AND AWARDS FOR OUTSTANDING ACHIEVEMENT IN COLLABORATION IN EDUCATION AND TRAINING

Purpose

An annual program of prestigious awards initiated in 1998 to recognise outstanding achievements in collaboration between business and higher education in the fields of R&D, and education and training. The objective of the program is to highlight at a national level the benefits of such collaboration, and enhance links between industry and universities.

Eligibility

At least one of the participating organisations nominated for the award must be a member of B-HERT.

At least one of the collaborating organisations must be in business and one in higher education. Each submission must be signed by all participating partners.

Frequency

Awards are made annually and presented at the B-HERT Awards dinner in November each year.

Number and categories of Awards

There are two Groups of awards.

The first group comprises two separate categories, (1) R&D, and (2) Education and Training. In each category, Awards are given for new initiatives, i.e. projects or programs in train from 18 months – 5 years, and for established initiatives, ie projects or programs that have been in train for more than five years. These categories are further divided into projects or programs which involve small-medium sized companies and large companies. Small-medium sized companies are less than $100m in sales or less than 500 employees. This results in eight Awards.

The second group comprises two special Awards for collaborative R&D:

- Outstanding Achievement in International Collaborative R&D, and
- Outstanding Achievement in Collaborative R&D involving a Cooperative Research Centre.

An application may be submitted for an Award in one or both Groups, provided it meets the appropriate criteria. However, no application can win more than one Award. Unsuccessful applicants for an Award are eligible to apply for an Award in a later year.

Criteria for Assessment

1. **Innovation** – has the project or program produced new products or services; how innovative is it in its concept or idea, design, delivery or content; what new barriers has it surmounted; what new challenges has it identified?

2. **Strength of Relationship** – (a) what is the extent of involvement of the partners? (b) how has this grown over the life of the project or program? (c) how do the partners work together in a productive partnership? (d) are there obstacles and barriers the partners have had to overcome to make the collaboration work? (e) what other spin-offs have there been from the project or program for participating organisations?

3. **Outreach Inclusion** – has the project or program attracted new participants since its inception; has it become a model for other projects or programs?

4. **National Benefits** – these may be economic, financial, social, educational or community benefits: may include for example, growth in exports, creation of new jobs and so on.

5. **Cultural Impact** – what impact has the project or program had on the cultures of the participating organisations? What changes have occurred in what is done and the way it is done in the participating organisations? What changes have there been in attitudes, behaviour or values in the participants?

PLEASE DESCRIBE HOW THE PROJECT OR PROGRAM PERFORMS ON EACH OF THE FIVE CRITERIA (ONE PAGE FOR EACH CRITERION)

Process

1. Applications for 2001 are now being sought from all Members of B-HERT.

2. Deadline for applications is **24 August 2001**.

3. Judging panel is:

   Professor Leon Mann, Pratt Family Chair in Leadership & Decision-Making, Melbourne Business School (Chairman)

   Dr Bob Frater, AO, Vice-President for Innovation, ResMed Ltd

   Ms Lesley Johnson, Director of Strategic Initiatives, Australian National Training Authority

   Mr Peter Laver, Chairman, Ceramic Fuel Cells Limited

   Dr Jane Munro, Principal & CEO, Firbank Grammar School

   Dr Peter Scaife, Director, Centre for Sustainable Technology, University of Newcastle

4. Evaluations will be completed by **12 October 2001**.

5. Awards will be presented at the B-HERT Awards Dinner on **15 November 2001 in Sydney**.

6. Submissions to be no more than one page on <u>each</u> of the five criteria.

7. Completed submissions to be sent to the Business/Higher Education Round Table at the following address:

B-HERT
Level 5, 1 Spring Street Melbourne Vic 3000
Ph: 03 9654 8824 Fax: 03 9654 8835
Email: bhert@ozemail.com.au

APPLICATION FORMS CAN BE OBTAINED BY CONTACTING THE SECRETARIAT OR DOWNLOADING FROM THE B-HERT WEBSITE ON WWW.BHERT.COM

B-HERT HIGHER EDUCATION SUMMIT

As a result of a one day Higher Education Summit, for members only, which was attended (all day) by the Hon. Dr David Kemp, MP, Federal Minister for Education, Training and Youth Affairs, we established a number of Task Forces on some key issues for the purpose of producing Position Papers for Government which provide recommendations or perhaps several alternative options for addressing each issue. Below is a list of the Position Papers that have, so far, been completed and published.

▶ The Role of Universities in the Regions ▶

Professor Hilary Winchester, Pro-Vice-Chancellor (Academic), Flinders University of SA
Mrs. Margie Cole, Assistant Registrar, Northern Territory University
Professor Andrew Glenn, Pro-Vice-Chancellor (Research), University of Tasmania
Professor Paul Thomas, Vice-Chancellor, University of the Sunshine Coast
Professor Kevin Sproats, Professor of Urban & Regional Governance, University of Western Sydney

▶ What is Needed to Make Australia a Truly Learning and Knowledge- Driven Society ▶

Professor Ian Reid, Deputy Vice-Chancellor (Teaching & Learning), Curtin University

▶ How Should Diversity in the System be Encouraged? ▶

Dr John Clarke, Manager, Strategic Policy & Planning, University of Southern Qld
Professor Iain Wallace, Vice- Chancellor, Swinburne University
Professor Paul Thomas, Vice-Chancellor, University of the Sunshine Coast

▶ Sharing Administrative Functions Between Universities at Lower Costs ▶

Kevin Woods, Pro-Vice-Chancellor (Resource Management), Murdoch University

▶ The Critical Importance of Lifelong Learning ▶

Professor Peter Sheehan, Vice-Chancellor, Australian Catholic University
Dr Mark Toner, President, B-HERT
(Ms Sheila Deane, HR Director, Kvaerner Process)
Professor Marilyn McMeniman, Dean of Education, Griffith University
Professor Judith Chapman, Director, Centre for Lifelong Learning, Australian Catholic University

LEADERSHIP IN INNOVATION COURSE

One of the most exciting initiatives B-HERT is involved in is the unique Leadership in Innovation program.

The program is an intensive three-module live-in training course for prospective R&D managers developed by the CSIRO and the Business/Higher Education Round Table (a forum of business leaders and university vice-chancellors) with significant input into the program from BHP, F H Faulding, and the University of Melbourne.

The Achievement Through Teams – Leadership in Innovation program involves three residential periods of five days duration (commencing on a Sunday afternoon and finishing Friday lunch time). **Module 1:** is about Self-Management; **Module 2:** Team Building; and **Module 3:** Organisation Culture and the Future of R&D.

The residential courses are held at small, quality conference centres close to capital cities.

The course design is specific to the needs of R&D technical project leaders; brings together participants from across organisations and functions; encourages integration of professional behaviour with personal goals; and encourages leadership through trust, respect for others and generating enthusiasm for a project.

The program is highly responsive to individual and group needs and provides an environment where participants form a strong learning community and ongoing networks.

The cost of the course is $12,000, which includes accommodation and meals, all training, course materials and coaching between modules.

Dates for the remaining Achievement Through Teams Course for 2001 are as follows –

Dates:		
ATT 18	Module 1	26 - 31 August
	Module 2	21 - 26 October
	Module 3	2 - 7 December
Information: Margaret Redford Ph: 02 6276 6265 or email: Margaret.Redford@lctd.csiro.au		

B-HERT *Policy Statements & Papers*

As a unique group of leaders in Australian business, higher education and research organisations, the Business/Higher Education Round Table (B-HERT) sees as part of its responsibility the need to articulate its views on matters of importance germane to its Mission. In recent times it has issued Policy Statements and Papers – copies of which are available from the B-HERT Secretariat.

Position Paper No.1 (July 1998) –

Higher Education in Australia: The Global Imperative

The Business/Higher Education Round Table (B-HERT) comprises the chief executives of many of Australia's major corporations and the vice-chancellors of Australia's universities, with the mission of advancing the goals and improving the performance of both business and higher education for the benefit of Australian society.

Education and training is a key ingredient in growing and developing the Australian economy. The industries of tomorrow are going to be increasingly knowledge-based. Higher education therefore is critical to the future of this country; in creating a "learning society" in which all Australians, of whatever social, cultural and economic background, have access to a post-secondary education of excellent value.

Without a national vision and sufficient investment in our higher education system, Australia and today's young Australians are likely to be marginalised as the region moves towards higher welfare standards and more advanced social and political structures. Our goal is that Australia must develop the expertise of its human resources so that it is a significant regional leader in professional, service, education and technological fields.

In today's environment there is a certain tension which universities and their staff feel in attempting to maintain the traditions of high quality research, scholarship and teaching.

Increasingly, reducing resources, coupled with a greater emphasis on revenue raising and entrepreneurial activities as well as inter-institutional competition, both domestic and international, have led universities and their staff to question their capacity to maintain the quality of the learning experience that they provide and the values of the research they undertake.

B-HERT has identified the necessary key features of the higher education sector in this country – the prerequisites for Australian universities to compete effectively at the highest international levels.

Position Paper No. 2 (October 1998) –

The Development of Co-operative Research Centres

CRCs were established in Australia in 1991 to foster ties between universities, industry and government departments and research organisations, in order to bring research closer to commercial realities and provide education and training opportunities. The program was established to address a number of specific issues, among which were:

1. The need to ensure that advances in science and technology were linked to applications in various sectors of the economy.

2. Related to this was the need to improve international competitiveness. The need to ensure that Australia's undergraduate and graduate programs in science and technology were of world class; specifically involving researchers from outside the higher education sector to ensure better quality and performance.

The CRC Program was to play an important role in ensuring that Australia benefited from the strength of its science and technology resources. Specifically, it would help ensure that Australian research and research training remained at the forefront in those areas of specific importance to the country as a whole.

There are 67 Centres currently operating in six industrial areas:

• manufacturing technology;
• information and communication technology;
• mining and energy;
• agriculture and rural based manufacturing;
• environment; and
• medical science and technology.

Overall the program has resulted in a strongly positive effect on Australian spending on research and development by government departments, universities, CSIRO and other public R&D agencies and industry.

Position Paper No. 3 (April 1999) –

The Case for Additional Investment in Basic Research in Australia

In the latter half of this decade many OECD governments, including the US, Japan, Germany, UK and Canada, have recognised public investment in basic research as essential for economic development. Emerging Asian economies, despite the setbacks of the recent financial crisis, are maintaining growth in public investment in R&D including basic research. All these countries have provided additional funding for basic research despite competing budget priorities.

Much of the economic growth in this decade is attributable to the growth of knowledge based industries particularly those associated with information technology and biotechnology.

Returns on investment in basic research over the next decade are expected to be even greater than in the 1990s. Completion of the sequencing of the human genome scheduled for 2003, for example, will provide unprecedented opportunities for growth in biotechnology industries for countries able and willing to position themselves. Australia is one of only eight to ten countries that have this capability. Continuing rapid advances in information and communications technologies provide immense opportunities for nations to exploit them.

As in the case of the UK, where substantial funding increases for research were provided within the context of a Competitiveness White Paper, Australia needs to ensure that additional funding is provided within a broader policy framework. Such a framework should ensure maximum returns from this investment through diffusion of knowledge to industry and community, improving the skills level of the workforce, encouraging organisational culture change and collaboration, and promoting competition.

Position Paper No. 4 (February 2001) –

The Critical Importance of Lifelong Learning

This paper aims to establish the significance of lifelong learning in the Australian context. Drawing on analyses of lifelong learning policies and practices in Australia and other OECD countries the paper seeks to identify a number of policy priorities for government, particularly in the areas of lifelong learning, business and higher education.

Position Paper No. 5 (June 2001) –

What is Needed to Make Australia a Knowledge-Driven and Learning-Driven Society?

This paper aims to identify major public policy challenges that stem from a proper understanding of the nature of knowledge and learning.

B-HERT PAPERS

B-HERT Paper No. 1 (June 1999) –

R&D Leadership Training: Direct Contribution to an Enterprise

Background

One of the biggest issues facing an enterprise is achieving commercialisation outcomes in the face of unpredictable change. Nowhere is this more challenging than in the area of transforming ideas and inventions into fully developed products genuinely valued by the marketplace. Leadership of R&D activities, particularly the development phase, and achievement through teams are critical to the success of an enterprise where many multi-disciplinary interactions and complex processes must be orchestrated to achieve desired outcomes.

F.H. Faulding & Co. Ltd is a diversified health and personal care company. Faulding's principal businesses are generic oral and injectable pharmaceuticals, consumer health products, the provision of distribution and retail management services to pharmacies and logistics management services to hospitals. Faulding markets its products to, and has representation in, over 70 countries and employs 3,500 people worldwide.

The Investment

The CSIRO/B-HERT R&D Leadership Program was selected to be the vehicle to assist driving change and improvements in Faulding's development processes.

Organisational Outcomes

Although the initial focus was on improved technical outcomes, an equally important benefit has been the major contribution of course participants in helping to resolve operational issues and implement major strategic and organisational change.

The team of trained participants has helped reduce total development and technology transfer times by 25-30%. A significant increase in the number of parallel activities has been achieved with a greater number of projects and product introductions being handled simultaneously.

Personal Outcomes

Due to its experiential approach the course has had a lasting and positive impact on all participants. Without exception all participants realised significant personal outcomes from the course – both in their professional and private lives.

Summary

In the context of the enterprise, benefits from the course require a significant commitment from management to ensure that a "critical mass" of participants is built up as quickly as possible.

Based on this experience the critical mass for training is believed to be approximately 10% of potential leaders from all relevant functions and the return on this investment in training is at least 10-fold within the first year – (in Faulding's case this represents a dollar contribution to the bottom line of $1.5 million in the first year).

B-HERT Paper No. 2 (August 1999) –

The Knowledge-Based Economy: – some Facts and Figures

Issue No. 5 (June 1999) of B-HERT NEWS focussed on "The Knowledge Economy". This B-HERT Paper extracts a number of statistical indicators from a document published in June 1999 by the Organisation for Economic Co-operation and Development (OECD), and provides some useful and interesting comparative data on Australia's relative global position within the context of the knowledge-based economy.

B-HERT *Paper No. 3 (September 1999)* –

B-HERT: Survey of Benefits from Commonwealth Government Business Programs

In recent times there has been considerable debate on the level of R&D undertaken by business in Australia, how we compare with other developed nations, and the trend of business expenditure over recent years.

Government programs designed to promote and encourage R&D and innovation obviously play a significant role in this context.

Raw statistics, whilst helping to measure and track levels of expenditure, do little to explain the underlying reasons for changes or trends in levels of expenditure.

B-HERT recognises the fundamental importance of R&D as the main driver of innovation, and the critical role government policy plays in building a supportive infrastructure for R&D.

In this context B-HERT decided to conduct a survey across a range of companies to try to better understand the reasons behind the statistics and the impact various Commonwealth Government programs were having on business R&D expenditure.

The Report identifies what the respondents saw as the critical issues in R&D support and provides a series of compelling short case studies highlighting the experience of the business community with various government business programs in support of R&D.

PLEASE NOTE THE

FOLLOWING DATE FOR

B-HERT MEETING:

Thursday,

15 November 2001

Sydney – ANA

Hotel, The Rocks

2.30pm-5pm (including

Annual General Meeting),

followed by Awards dinner.

2001

Distinguished Speaker Series

In 1998 B-HERT introduced a Distinguished Speaker Series of addresses each year featuring eminent "thought leaders" speaking on topics of interest to both the business community and academe.

We are delighted to announce the following Distinguished Speaker for 2001.

Dr Robert Dane, Managing Director, Solar Sailor Pty Ltd, will deliver a luncheon address entitled –
"Hybrid Power Systems for Marine Applications" on board the Solar Sailor in Sydney, on **Friday, 31 August 2001.**

Dr Dane was born and educated in Sydney. He is a medical doctor with a long history of rowing and sailing on Sydney Harbour and a passion for science and technology. He ran a successful practice on the NSW South Coast for 10 years and was chairman of several hospital and medical committees. In 1996 he conceived and patented the SolarWing, founded Solar Sailor Pty Ltd, raised capital and project managed the research and development, design and construction of the highly successful Marjorie K prototype. He then capital raised and gathered State and Federal government to construct a functioning 100 person commercial eco-tourism ferry in time for the Sydney Olympics. This having been successfully completed he has now formed a highly qualified team and with the focus of commercialising the concept worldwide.

Sponsored by: UTS

Members are asked to note this date in their diaries. Further information will be given in due course.

2001

## *Distinguished Speaker Series*

Sponsored by: P&O Australia

The following are extracts from an address entitled: "Britain and Australia Today" by the Hon Sir Alastair Goodlad KCMG, British High Commissioner to Australia, given at a Distinguished Speaker Luncheon on Monday, 14 May 2001 at the ANA Hotel, Sydney.

Thank you for inviting me to lunch today and to join the list of illustrious guests who have addressed the Business/Higher Education Round Table.

My subject is *'Britain and Australia Today'*. Our relationship is rich and vibrant.

We share a core of common values – the ideals of democracy. We enjoy a dynamic commercial relationship. There is a constant interchange among researchers and academics. Defence links are important to both of us. There is a close and constant exchange of ideas at a political and policy level. Internationally, we work together in many fora, including the UN and the Commonwealth, with the common aim of shaping a better world. And binding all these strands are the connections of family and friendship, created and renewed by migration and travel.

Today I want to look at where we are and also where we are going.
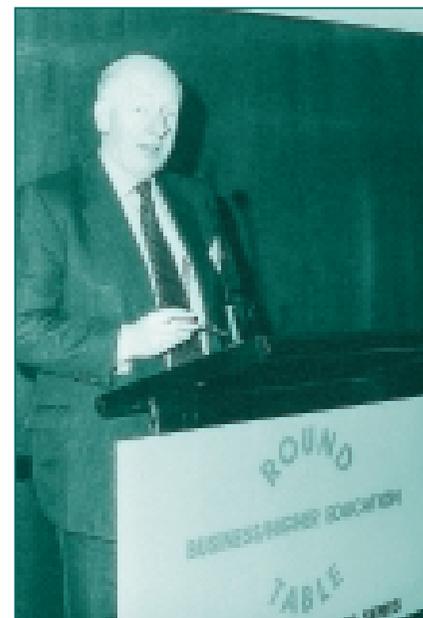
The relationship has developed very quickly over the past ten years. Far from being static, UK-Australia ties are characterised by change, and I believe that this will continue.

I also believe that there is a continuing challenge for us to tend the relationship and look at ways to develop it.

Let me begin with a few lines from Wordsworth:

> *We must be free or die, who speak the tongue*
>
> *That Shakespeare spake; the faith and morals hold*
>
> *Which Milton held.*

Those lines sum up some of what Britons and Australians share. The belief in the right to freedom, under the law. In justice for all. In the right to choose how we are governed, and by whom. These are rights which we take for granted but which are luxuries elsewhere in the world.

Britons and Australians are united by values, and in the past twelve months I have had the pleasure of attending two special parliamentary sittings which reached back to the beginnings of Australia's federal parliamentary democracy.

The first was in London, almost a year ago, during the Australia Week celebrations which marked the centenary of the passage through Westminster of the Bill which established the Australian Commonwealth. The second, a triumphant successor to the first, took place last week in Melbourne, when the Federal Parliament returned to its original home for commemorative centenary sittings.

The two sittings were a perfect expression of how deeply our histories are intertwined.

On that shared history we have built a remarkably broad-based modern relationship.

One part of our relations which has a particular dynamic is the commercial element. Britain is an attractive market in its own right, as so many Australian companies have already discovered. It is also an ideal base for doing business in Europe. It owes its strength to a skilled workforce and a strong economy – the fifth-largest in the world. In London it has the world's leading financial and business centre, with 32 per cent of the daily global foreign exchange turnover. It is the leading centre for trading in the euro.

Left: Sir Alastair Goodlad KCMG, British High Commissioner to Australia

If the UK is an ideal gateway for Australian companies doing business in Europe, Australia can make the same claim for European firms doing business in the Asia-Pacific. Many of the companies have been here for a long time. Cable and Wireless, Reuters, BP, P&O, BAE Systems, Cadbury-Schweppes, HSBC. Others, like Virgin, are flying in. British firms make up half of all European company regional headquarters in Australia. The business partnership should continue to prosper.

Trade and business are going from strength to strength. The UK's exports to Australia in January rose by 29 per cent on top of a 24 per cent increase in 2000 over 1999. Australia's exports to Britain in January went up by 22 per cent.

Trade last year made Australia the UK's fifth-largest market for goods outside the European Union. As a market, New South Wales alone is as important to Britain as Greece or Malaysia; Victoria alone is on a par with the Czech Republic or Mexico. In 1999, Australia's exports to the UK were worth more than $A.5 billion. Coal and iron ore were staples, but they were exceeded in value by what the statisticians euphemistically call "beverages". Last year we drank half of the wine Australia exports. It makes me proud to be British.

Britain is the second-largest foreign investor in Australia, after the United States. British holdings have doubled in a little over five years. Australia's rate of direct investment in Britain is second only to its levels of investment into the USA.

Tim Fischer once calculated that British investment provided about a quarter of a million jobs in Australia. Australian investors play a similar role in the United Kingdom, where thousands of jobs have been created by Australian companies in insurance, banking, metals processing, industrial services and oil and gas. About one person in every nine is now insured with an Australian company. Five million Britons have accounts with banks which have an Australian parent.

> **"In the mid-1990s… the Australian and British governments were conscious of the dangers in letting erroneous and sometimes destructive stereotypes take hold."**

In government, we enjoy a close and constant exchange of policy and political ideas, prompted not only by the similarities of our systems of governance but because we often face similar problems.

This year both countries face national elections. The political debate and priority issues are almost identical. How to provide the right public national health funding, and balance public and private health provisions. In education, there is debate in both countries on the level of government funding and support for education and science. High fuel prices, regional disadvantage, how to manage – and compensate for – the effects of economic rationalisation; asylum-seekers, international crime and drugs are all issues being vigorously examined and debated in both countries.

And both governments, and politicians generally, are looking for ways to engage people in politics, and bring government closer to the people they serve, in an attempt to dispel negative images of politics, and the cynicism that some in both countries feel towards politicians and the political process.

Ministers are in frequent touch with one another; their departments sometimes intensively. Backbenchers stay in contact through valuable associations like the Commonwealth Parliamentary Association or parliamentary friendship groups, party organisations and personal friendships which defy the tyranny of distance.

As we exchange ideas and experience on domestic matters, so our two countries work closely together on international affairs; jointly, and in fora like the UN and the Commonwealth. There is a high level of agreement between us, as you would expect from nations which subscribe to the same principles.

Both countries play significant roles in the Commonwealth. The UK will work closely with Australia in the lead-up to CHOGM in Brisbane in October. Robin Cook and Alexander Downer are both active in the Commonwealth Ministerial Action Group, and we are particularly grateful to have Mr Downer as a member of the mission which, we hope, will soon visit Zimbabwe to assess the situation.

Both countries have a legacy in the South Pacific. Britain welcomes the prominent and pivotal role which Australia plays in the region, and looks to offer its support in improving the political and economic environment – for example, in Fiji, the Solomon Islands, Papua New Guinea and Bougainville.

Britain both welcomed and supported Australia's leading role in East Timor. Australia will continue to have an influential role after the first independence elections in August. The UK and our EU partners will look to provide continued assistance to East Timor until she is ready to be self-sufficient.

Britain recognises Australia's depth and breadth of knowledge about Indonesia and, like Australia, wants to see a stable, democratic, economically vibrant country. Both our countries are trying to support non-governmental structures in Indonesia.

We are both concerned to promote democracy, development, stability and security. We both support further trade liberalisation because we believe it will contribute to those ends by generating trade and raising prosperity. We both favour a new WTO round.

Defence links, too, are important to both countries. At any one time about seventy British service personnel are training in Australia or serving with Australian units, and a comparable number of their Australian counterparts are with British forces. There are

regular high-level exchanges between senior staff and defence-science staff. Joint exercises are frequent – last year we had two Tornado fighter units operating for more than a month in northern and central Australia. It means that large numbers of people in both services know how the other operates. Their knowledge and experience stands us in good stead when we have to operate together in theatres of danger, as we did when Australia led INTERFET, including the Gurkhas, into East Timor.

History, commerce, politics, defence relations are leavened by a myriad of close personal ties, links of family and friendship which have been created by migration and travel, and are still refreshed by such adventures.

More than one million Britons have made Australia their home – the largest migrant group. Their children make up those 1.6 million Australians who have a parent born in the UK. Even today the UK is the second-largest source country for migrants to Australia (9,000 in the year to June 1999) after New Zealand; and Britons top the list of those taking out Australian citizenship.

Australians and Britons are inveterate travellers, whether their intention is to do business, see the sights, work for a while or catch up with friends and relatives. In 1999, there were almost three-quarters of a million Australian entries to the UK, and about 600,000 Britons visited Australia in the same period. Many of them came to stay with me in Canberra. Despite foot and mouth, visa applications by Australians are up by 15 per cent this year. These travellers forge new links and create a new generation of ties.

I could add more to the list – the British scientists who are watching the stars at Siding Springs; the British students who are taking higher degrees at universities here, the Australian programmes which are so popular on British TV, and British programs viewed here. I should add – the Australian vets who have rendered such invaluable help in controlling foot-and-mouth disease. Suffice to say that the ties between us are woven through every aspect of our national lives.

At the beginning of the third millennium, how should the relationship develop? How do we want it to develop? The future is at least partly in our hands. The relationship is changing, and has changed, for a number of reasons.
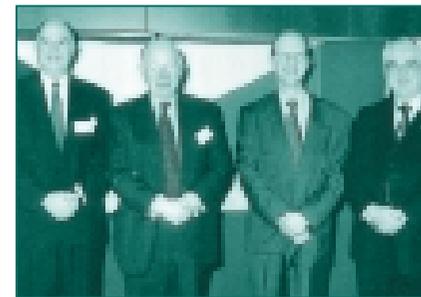
The Centenary of Federation is a celebration of a century-old democracy.

A theme that has emerged strongly in the Centenary of Federation is that Australia is now a successful multicultural nation, as Britain is. Though the reconciliation process has not ended, Australians look back on a half-century in which people from all parts of the world have made this country home, a process that has come about without hostility and division.

Culturally, Britain and Australia have become quite different from the places our parents knew. Both are, as I say, now genuinely multicultural societies. There is a great deal more mobility than there used to be. Yet much of what we know about one another is obsolete, or limited.

Much of it is processed through advertising or the media. Some of this comes from determined attempts to put over an image which will sell a service or a destination. Palm trees and white beaches in Queensland. Guardsmen in splendid red at Buckingham Palace. That's not to say the white beaches aren't enticing or the guardsmen splendid. But there is more to the story.

Perhaps there's also an element of comfort in this. We have had so much to do with each other over so many decades that perhaps familiarity has bred a certain complacency. But the Britain-Australia bond is too important for us to take it for granted. I would like to see us think more about each other – and more of each other, as well.

In the mid-1990s, when I was Minister of State, the Australian and British governments were conscious of the dangers in letting erroneous and sometimes destructive stereotypes take hold. The kinds of views that see Britain as comfortable but tradition-bound. Or the view that Australia is a trackless wilderness dotted with kangaroos, and inhabited by amiable, easy-going people who live for the surf.

The governments challenged these perceptions with a year-long campaign called New Images – ably run by Jane Westbrook, who I am pleased to see here today. The name is a clear enough indication of its objectives. It was run in both Britain and Australia, and it saw an enormous range of activities – artistic, scientific, educational, commercial and political.

Australia's technical credentials were displayed on the Thames, where a high-speed catamaran went on show. We focussed on contact between young people in both countries, and set up numerous links between Australian and British schools so that their pupils could learn first-hand what life is like "over there". Music, art, fashion, all had a part in tilting at the outdated stereotypes.

Was it successful? To some extent I am sure it was. But you can't change entrenched popular views easily.

Left-Right: Dr Mark Toner, President, B-HERT; Sir Alastair Goodlad, British High Commissioner to Australia; Mr Joe Fischer, Group General Manager Human Resources, P&O Australia Ltd.; Professor Ashley Goldsworthy, Executive Director, B-HERT.

It was valuable for those who were involved – not least for those schoolchildren who were able to sit down at a computer and find out about daily life from their fellows on the other side of the world.

The task continues. The governments mounted another valuable exercise in February this year. As part of the Centenary of Federation, we held a Young Leaders' Forum at Parliament House in Sydney, drawing together Australians and Britons who are tomorrow's leaders in business, politics and administration.

It was an eventful, stimulating two days. The agenda was substantial and the debate incisive. The speakers discussed political structures and constitutional change, they looked at questions of national identity, and surveyed the prospects for fruitful economic partnerships.

Giving people the opportunity to meet and network was valuable, but the exchange of ideas – which we trust will long outlast the forum – was the real point of the exercise. Intellectual exchanges like this will, I believe, make an important contribution to our continuing friendship.

As part of the Centenary of Federation, our aspirations as well as the special qualities of our relationship are soon to be commemorated at a symbolic precinct in Canberra.

The precinct is Magna Carta Place, that area of parkland on the western side of the Old Parliament House Senate Garden which will be landscaped and adorned with a pavilion to mark the Centenary of Federation. The British Government's contribution to this project is our gift for the centenary.

It is a good example of British-Australian co-operation in every way. It has been conceived and developed by the Australia-Britain Society, and the winning design is the result of a collaboration between Australian architect Alastair Falconer and British exhibition designer Marcus Bree.

The precinct is intended to celebrate the values we share, which give our societies their character and quality. It is a fitting symbol for the past we share, and the principles on which, together, we might help to create a better world.

Our destinies have been intertwined for over two centuries, in war and peace. As we enter the new millennium and celebrate the Centenary of Federation throughout Australia, I feel a special sense of privilege in being entrusted with a role in building on a relationship which has created so much that is good in the past and will, I believe, create so much that is good in the future. ◆

SIFE LEADERSHIP SEMINARS

The KPMG SIFE Australia National Competition was held on Saturday 2 June 2001 at the Star City Convention Centre. The National Competition allowed university SIFE Teams to share the results of their SIFE projects with a panel of judges composed of business executives and entrepreneurs. For a full briefing on the competition, please visit www.sife.org. The Competition Results were:

Anderson SIFE Australia National Champions
University of Melbourne
Mentor - Ms Emma O'Connell
Trophy and $4,000 Cash

The University of Melbourne SIFE Team will represent Australia at the SIFE World Cup in London, England on 11-13 July 2001. Good luck Uni Melb SIFE!

Heinz Wattie's 1st Runner-Up
University of South Australia
Mentor - Mr John Thornton
Trophy and $2,500 Cash

The Reject Shop 2nd Runner-Up
Griffith University
Mentor - Mr Peter Woods
Trophy and $1,000 Cash

If you're interested in getting involved with SIFE Australia, please contact John Thornton, Executive Director, SIFE Australia, Ltd C/- Flexible Learning Centre
E-mail: SIFEAustralia@sife.org

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The purpose of the Business/Higher Education Round Table (B-HERT) is to pursue initiatives that will advance the goals and improve the performance of both business and higher education for the benefit of Australian society.

It is a forum where leaders of Australia's business, research and academic communities can examine important issues of mutual interest, to improve the interaction between Australian business and higher education institutions, and to guide the future directions of higher education.

Mission Statement

In pursuing this mission B-HERT aims to influence public opinion and both government and non-government policy on selected issues of importance.

B-HERT believes that a prerequisite for a more prosperous and equitable society in Australia is a more highly-educated community. In material terms it fosters economic growth and improved living standards – through improved productivity and competitiveness with other countries. In terms of equity, individual Australians should have the opportunity to realise their full social, cultural, political and economic potential.

The membership of B-HERT comprises, by invitation, the chief executives of major Australian corporations and public research organisations, and the vice-chancellors of Australian universities.

B-HERT pursues a number of activities through its Working Groups, State Chapters and active alliances with relevant organisations both domestically and internationally. It publishes a regular newsletter (B-HERT NEWS), reporting on its activities and current issues of concern relevant to its Mission.

BUSINESS/HIGHER EDUCATION ROUND TABLE A.C.N. 050 207 942
Shell House, 1 Spring Street, Melbourne Victoria 3000 Phone: 61 3 9654 8824
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OF DOLLARS & CENTS REPORT

This study, by the Institute for Research into International Competitiveness at Curtin University of Technology in Perth, commissioned by the Business/Higher Education Round Table (BHERT), quantifies for the first time the enormous contribution made by the university sector to the national economy.

The study measures the economic impact of the university sector in three ways –

1. The income and employment generated by teaching and research;

2. The enhancement of the nation's human capital through its education of university graduates; and

3. The creation of wealth through the spillover effects of its R&D activities.

The Report quantifies each of these impacts separately. It shows that the government gets a positive payback in a number of ways.

It is interesting to note that less than half the total economic impact of the university sector comes from the direct expenditure of universities. Of more significance is the estimate that the total impact is some $22 billion per year.

The Report provides a unique insight into the information and methodologies utilised in the study. It underlines the importance of higher education as an "economic good." In his Foreword to the Report Dr. David Kemp, Minister for Education, Training and Youth Affairs says:

"…it provides a foundation from which to consider the crucial issues of public and private funding of higher education." And further "...note(s) how valuable the information it contains will be for everyone interested in higher education issues."

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