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Case 1

From Automation to Knowledge Management: Modernizing British Government with ICTS*

Christine Bellamy

This Green Paper marks the beginning of a new phase of . . . radical and wide-ranging reform. It will be founded on the new possibilities offered by information technology . . . It will change fundamentally and for the better the way that government provides services to citizens and businesses. (Foreword by the Minister for Public Service to the Green Paper, government.direct, November 1996)

The e-government strategy is a fundamental element in our Modernising Government programme. It identifies a common framework and direction for change across the public sector. (Foreword by the Minister of State, Cabinet Office, to E-government: A Strategic Framework for Public Services in the Information Age, April 2000)

In the UK, as elsewhere, the development of new, technologically-enabled ways of managing and communicating information is coming to the fore in relation to government reform. As these quotations from recent policy documents illustrate well, the shift to information-age government is seen as a key element in the British Government’s modernization strategy. Thus far, however, the rhetoric of information-age government has outstripped its achievements and governments still have a long way to go in fulfilling the radical promises made for the transformatory powers of information and communications technologies (ICTs). It remains the case that governments make heaviest use of computers as production technology, for automating data-processing in the back offices of public administration. Much less use has so far been made of ICTs as informing technology, for example for marshalling new kinds of information for policy-makers or for establishing new, more interactive and flexible ways of communicating with service users and citizens. At the end of the 20th century, the reality of British Government, for example, was that most data were still being captured from members of the public on paper forms. Few departments had systematic arrangements for doing business with the public over the telephone, still less for conducting transactions over the internet (Bellamy and Taylor, 1998a; National Audit Office, 1999). Huge quantities of data flowed into government, but most of these data were locked into stand-alone mainframe processing systems with restricted inter-operability. The result is that inflexible information management is widely acknowledged to be an important barrier to modernizing government, as the present Government is pledged to do. Modernizing the use of ICTs lies, therefore, at the heart of the Blair Government’s commitment to public service reform and this article describes how this important task is being approached.

Governments worldwide became seriously interested in the transformatory potential of ICTs in the early 1990s when, for example, the implications for public service reform of the so-called ‘information highway’ were identified in the American Federal Government’s National Performance Review. The claim in the NPR was that ‘re-engineering government through IT’ could help deliver ‘government that works better and costs less’ (Office of the Vice President, 1993a, b), thus

* International Review of Administrative Sciences 2002; 68; 213
promising to resolve the age-old dilemma between efficiency and quality in public services. This claim married well with the consumerist flavour in British public service management reform as it was understood by the Conservative Government led by John Major, as well as with the Reinventing Government movement in the US. In Britain, however, government computing was at that time in the hands of the CCTA (the Central Computing and Telecommunications Agency, then known confusingly as the Government Centre for Information Systems). Although it was part of the British Cabinet Office’s Office of Public Service — which spearheaded public service reform — CCTA had little political clout and its somewhat tentative consultation papers on the implications of the information superhighway were neither particularly influential nor widely noticed (CCTA, 1994, 1995). It was not until 1995 that Michael Heseltine, the Deputy Prime Minister, was persuaded (not least by officials from CCTA itself) to set up a small Central IT Unit (CITU) in the Cabinet Office. In line with contemporary emphasis on externalizing government functions into the private sector (a policy in which it was to the fore), the remit of CITU was to take the lead in harnessing private sector expertise for strategic change within government. It was in this context that serious work began in CITU on developing an information-age strategy for British government. The first indications of what such a strategy might entail were published in November 1996 in the Green (discussion) Paper, government.direct (CITU, 1996). Following a period of public consultation, the principles set out in this paper were formally adopted by the Conservative Government in March 1997, when a series of small-scale pilot projects were launched.

The principles of government.direct were endorsed with great enthusiasm by the New Labour Government elected in May 1997. During long years in opposition, the ‘modernizing’ wing of the Labour Party — including Blair himself — had become convinced that information-age technology would be an important tool in wide-ranging plans for modernizing both the economy in general and public services in particular (Labour Party, 1995; Central Office of Information, 1997). Indeed, since coming to power, the New Labour Government has become ever more strongly committed what are now referred to as ‘e-commerce’ and ‘e-government’ strategies (CITU, 2000; Performance and Innovation Unit, 2000a). Targets for implementation have been successively refined, to the point where we are now promised that 100 percent of all transactions with government will be available electronically by 2005, and every public sector organization has been required to show how it will achieve this target. To support this aim, officials in CITU — and its successor organization in the e-Envoy’s Office — have spent the last few years working up a set of documents that provide a framework for developing e-government across British public services. These documents cover a wide range of issues, including the use of portals, call centres, smart cards, websites and digital TV, as well as attending to such matters as data-standards, meta-data and authentication arrangements. The approach is firmly rooted in well-established traditions of government computing, in that it continues to be strongly preoccupied with electronic service delivery (ESD). This emphasis is necessarily reflected in the present article, which has little to say on the relationship between ICTs, electronic citizenship and electronic democracy. As we will see, the Government is also showing more interest than hitherto in exploiting information-age networks to enhance the quality of information resources available for policy-making, but the main significance of e-government for public policy is that policy options are no longer so constrained by traditional service delivery arrangements. E-government, it is widely believed, has the potential to support radical policy change by helping to transform governments’ interactions with public service users and clients.
E-government: towards electronic service delivery

Interest in e-government in general, and in ESD in particular, is best seen as a reaction to the growing fragmentation and complexity of government. It has become fashionable to conceive of government as a set of ‘information silos’ that create high barriers to flexible information flows (Byrne, 1997; 6, 1998). E-government promises to dissolve the silos, at least in the eyes of public service users. In Britain, the centrepiece of joined-up e-government is UK Online (Office of the e-Envoy, 2000a; 2001a). UK Online is the brand name of e-government in Britain, and is designed to bestow a halo of trustworthiness and confidence over the whole enterprise of e-government. The frontline presence is provided by the UKOnline Portal at www.ukonline.gov.uk. The Portal went live at the end of 2000 and is intended to offer a high profile and convenient electronic route into all public services, regardless of which tier of government provides them. It will be equipped with facilities for ‘advanced personalization’ that is for users to configure its homepage to reflect their personal interests and needs. Specialist public service portals, such NHS Direct, the medical help-line run by the National Health Service, will continue to provide information and services, but will be linked to UK Online. The UK Online Portal is still rudimentary, but when it is fully established, it should provide access to a wide range of information and services that will be available through several different channels, including information kiosks, call-centres, PCs, digital TV and 3G phones.

The Government Gateway at www.gateway.gov.uk provides the middle tier of UK Online, and can be accessed direct or through the UK Online Portal. The Gateway went live in February 2001 and offers facilities for online transactions between public services and their users. In the first instance these were restricted to a few transactions with single departments — filing Pay As You Earn tax returns, Value Added Tax returns and applications for agricultural aid. It is planned to increase this limited range of transactions substantially over the next few years, especially to include transactions involving multiple departments. In technical terms, UK Online provides middleware capable of taking data from several different channels, sorting them and distributing them to a wide range of back-office systems. An important element in developing the Gateway will therefore involve the establishment of reliable security and authentication services. UK Online connects to government departments via the Government Secure Intranet (GSI), which the British Government claims was the first of its kind in the world. The GSI is intended to provide secure infrastructure for transmitting data around government, supporting services and projects that cut across departmental boundaries. It will also support co-production of services and policy with the private and voluntary sectors, by providing extranet facilities to external partners. The whole of this e-government edifice is supported by e-GIF, the Government Interoperability Framework (Office of the e-Envoy, 2000b), a document that lays down mandatory technical and data standards based on internet protocols for connection to the GSI and UK Online.

Implementing e-government in the UK: what’s in it for politicians and bureaucrats?

The political background. So, why is all this paraphernalia being put in place, and how will it be used? The Government is driven by a complex set of motives, not least of which is its desire to position the UK prominently within the global information economy. The Government's e-commerce strategy (PIU, 1999) aims to make the UK the European hub for e-commerce, founded on a large domestic market with more-or-less universal access to the internet. This aim is to be achieved by
the middle of the present decade. The high profile commitment to e-government shows that
government is playing its part.

E-government is, however, more than the government wing of e-commerce. It is also critically
important to the present Labour Government’s core political project, a project that is centred on its
overarching commitment to ‘modernizing government’ (Prime Minister and Cabinet Office, 1999).
Here, the Government is treading an interesting path between political traditions. As a party of the
Centre Left, New Labour needs to distance itself from the attack on public services associated with
New Public Management, especially its harsh Thatcherite manifestations. An important element in
the Government’s platform is a commitment to placing greater value on public services and those
who use them. The stance is one of ‘modernizing government’ rather than rolling it back. But as
New Labour, the Blair Government is also keen to distance itself from big-spending, high-taxing
Labour governments of the past: the so-called ‘Third Way’ is not simply old-style social democracy
warmed-up and served on clean plates (Giddens, 2001). Instead, it emphasizes the continuing
search for greater efficiency, effectiveness and selectivity in the use of public services. This
emphasis is driving policy development as well as public service reform, and this is the main
departure from the agendas of recent Conservative governments. New Labour is keen to target
scarce resources on people that need and deserve them and on social policies that can be shown
to ‘work’. Above all, it has become associated with an approach to ‘citizenship’ that recognizes
duties as well as rights, and points to an active role for the state in guiding individuals towards
economic independence and civic responsibility. The Government therefore wants to be regarded
as tough on crime and the causes of crime, but tough, too, on welfare fraud and voluntary
unemployment. We will see that ICTs are playing a key role in securing these aims, particularly in
the increasingly interconnected policy sectors for education, employment, welfare, training and
criminal justice.

So far as many bureaucrats are concerned, the main benefits of this intermeshing of e-
government and third-way policies is that it is liberating resources and providing political clout for
ICT-enabled public service reforms that, in some cases at least, have been on the bureaucrats’
agendas for many years (Bellamy, 1996; Bellamy and Taylor, 1998b). But civil servants are trained
to be sceptical and the Government has some way to go in overcoming Whitehall’s strong ‘disbelief
culture’ in relation to fundamental reform. So what does e-government have to offer service
providers; and what are the outstanding points of contention?

One-stop services and the client group principle. The most important promise made for e-
government is that it will make public services more ‘citizen-centric’. More flexible ways of
managing information provide opportunities to liberate service delivery arrangements from the
constraints imposed by the structure of back-office tasks. This should enable front-office
arrangements to be more closely designed to meet to citizens’ needs — or at least to bureaucrats’
interpretations of citizens’ needs. In practice, this means that customer-facing departments are
becoming more interested in analysing patterns of usage and demand, so that service delivery
processes can be concentrated into a series of ‘product groups’. In the terminology of classical
administrative theory (Gulick, 1937; Self, 1977), e-government is contributing to a broad shift from
‘organization by function’ to ‘organization by client group’. In Britain, this shift is already clearly
apparent in several of the policy sectors listed earlier. Services and information aimed at people
involved in the criminal justice system, for example, are being reoriented to client groups consisting
of ‘victims’, ‘witnesses’ and ‘jurors’ (Lord Chancellor’s Department, 2001). Contact centres are
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being set up to deal with each of these groups, using a mix of ‘channels’ such as telephone, email and web-sites. As I have described elsewhere (Bellamy, 1996), the former Department of Social Security (DSS) has long entertained the notion of using new ICTs to reorganize welfare administration so as to focus on the needs of its main client groups. But it was not until 1999 that it was re-organized into units dealing respectively with three main groups: families with children, retired people and people of ‘working age’. These three client groups now form the three pillars of the new Department of Work and Pensions (DWP) set up after the general election in the summer of 2002. The DWP has inherited the DSS’s e-business strategy which divided each of these groups into ‘customer segments’, in order to determine the specific mix of electronic channels that are most appropriate to each segment. The guiding principle is that electronic channels will be used to increase customer choice and will therefore be offered as additions to existing arrangements. But the Strategy also states that ‘we have preferred channels for our contact with citizens . . . and that in some circumstances we will seek to influence those choices’ (Department of Social Security, 2000: 8). What this means in practice is that the DWP will focus scarce resources available for face-to-face contact on three main segments of its ‘customer base’: people with special needs, such as the disabled or elderly; people who are suspected of welfare fraud; and people of working age. Claimants in this third group are being subjected to increasingly strong compulsion to accept strong guidance into training or work. Welfare, training and job search services for this group are now provided through specialist one-stop outlets set up under a project known as ONE (Select Committee on Social Security, 1998–9). Other social security customers will be diverted from face-to-face contact towards ‘managed telephony’, in which telephone transactions, such as completing a claim form, will be assisted by DWP staff. The Strategy also exploits the flexibility provided by ICTs to enable more use of external partners, such as voluntary agencies, to provide services to more favoured groups, especially retirement pensioners who, it is thought, recoil from the stigma of dealing directly with the social security system. Customers in these segments will eventually be guided towards information services and electronic transactions on the UK Online Portal and the Government Gateway. However, the DSS’s best forecast was that this stage will not be reached until (at least) 2006, and then only if the security of the GSI and the Government Gateway can be guaranteed.

Efficiency, transparency and equity. How will these changes impinge on values such as efficiency, transparency, fairness and equity? The first point to make is that the supporters of e-government believe that it will reverse many of the dysfunctions associated with large-scale bureaucracy, not least because it alters the point where decisions about individual cases are made. The construction in the 1970s and 1980s of large-scale mainframe systems tended to standardize administrative routines, to remove decisions from street-level staff to centralized processing centres and thus to reduce the discretion available to address individual needs. These systems intensified the rigidity, impersonality and opacity of decision-making, and increased the discipline exerted by centralized bureaucracies over street-level staff and their clients. In contrast, e-government promises to put more emphasis on the quality of front-office interactions with service users. Online transactions will be no less structured by information systems, but putting such devices as electronic ‘welfare benefits calculators’ and self-service tax assessment forms on the Web should at least expose the calculations by which decisions are made and make service users’ options more transparent and comprehensible. From the bureaucrats’ point of view, they should also make services less vulnerable to error and complaint. The increased use of remote, unmanned electronic channels will allow departments to free-up manpower for critical encounters between citizens and the state, especially encounters that rely heavily on the exercise of discretion.
in sensitive or complex situations. As we have already seen, the new DWP has decided to focus street-level manpower on implementing reforms aimed at influencing the lifestyles and economic choices of specific categories of welfare claimants. ICTs will enable encounters with these claimants to be better supported and also to be subject to enhanced quality control. For example, the GSI will eventually provide all front-line staff in the social security system with online access to customer records and to its voluminous administrative codes, so that accurate, timely decisions can be made over the counter or telephone.

What are the benefits and dangers of such an approach? On the one hand, the application of ICTs will give DWP flexibility to tailor services and information to different service users' needs. On the other, the logic of the client group principle positively requires officials to categorize and label client groups, with two obvious consequences. First, especially in politically sensitive sectors such as welfare policy, the labels attached to client groups inevitably acquire normative overtones, reinforcing stereotypes that inevitably influence bureaucrats' attitudes to different client groups. The assumption is, for example, that people in the working-age client group are most likely to commit fraud; and it is on this group that computer-aided customer profiling and data-matching techniques are being focused (DSS and Employment Service, 2000: para.10). In other words, the enhanced increased surveillance and privacy invasions commonly associated with information-age technologies will probably fall unequally on different groups, a neat information-age twist to the distinction between the deserving and undeserving poor that has been woven firmly into British social policy for over 100 years. A second consequence may be an increased tendency to ascribe to individuals the perceived characteristics of the client group to which they are assigned. As we have seen, e-government is said to encourage ‘citizen-centric’ services, focused on individual needs. The danger is that it will also encourage a greater inclination to shape policy and service provision to stereotypical perceptions about different client groups.

Equity and access. So far as normative issues are concerned, the proliferating documents on e-government are, in general, much less concerned with how ICTs impinge on the fairness and outcomes of administrative decisions and are much more concerned with equity of access to information-age channels. The 100 percent ESD target, together with the Government’s equally ambitious target for near universal access to the internet by 2005, both point to a world where transactions over the internet will soon be technically feasible for most citizens, whether or not they are appropriate for other reasons. But will these channels be affordable and how will cultural and social factors affect their growth and dissemination? This is a particularly important question for departments, such as the new DWP, that deal with massive numbers of citizens in low income groups. The problem is that the business case for electronic service delivery will only stand up if there is a critical mass of users from among a department’s clients. Widespread access to the internet is also being regarded as a crucial element of strategies to deal with social exclusion and disadvantaged neighbourhoods. Initiatives to counter the digital divide are therefore perceived to be critical to the success of e-government and e-commerce and, at the same time, as an increasingly key element in the Government’s social and economic policy. The most important initiative in this field is the decision of the Department for Education and Employment (now the Department for Education and Skills) to establish 1200 UK Online Centres throughout the country, with another 1050 promised in the near future (Department for Education and Employment, 2001a). Most of these centres will be located in further education colleges or community centres, and all 4300 public libraries will also be linked to a People’s Network offering similar facilities. They will provide access to the internet and training in ICTs, and will actively guide users towards online
services, especially those concerned with education, training, careers guidance and job search facilities. UK Online is also being supported by a number of other initiatives, including initiatives to place networked computers in every school, a National Grid for Learning which provides online links to a host of information-age resources for schools and teachers, an online University for Industry, and free ICT training courses for the unemployed. Together with information kiosks in such places as the local offices of the DWP, all these initiatives are intended to ensure that by 2005, everyone will have access to the technology and skills to get online. They will also play an active role in the Government’s supply-side labour market, as well as its neighbourhood development, policies (Department for Education and Employment, 2001b).

It is hard to judge how effective these initiatives will be. Much will depend on the success of the Government’s e-communications policies, which are geared to reducing dependence for internet access on relatively user-unfriendly PCs in favour of more accessible devices. The relevant government departments, Trade and Industry and Culture, Media and Sport, are pushing hard to disseminate digital TV; and launched a demonstration initiative in April 2001 to provide residents in a number of neighbourhoods with free conversion to DTV and assess its impact (Department of Trade and Industry, 2001). The British Government was also a relatively early mover in franchising third-generation phone services that should be capable of connecting users to the internet. What is certain, however, is that there is a great deal of scepticism in many parts of government about the ease with which service users, especially those from lower income groups, will take to transacting with government via the internet, as witnessed by the plans of the former DSS and the Employment Service to extend the use of managed telephony, even beyond 2005.

Privacy, authenticity and security. Another major concern within British Government is with the security, authenticity and privacy of data that are transmitted online. Indeed, it is proving to be one of the most sensitive and difficult issues to resolve. The Government Gateway will embed into the heart of government unprecedented technical capacity for data-matching and, potentially too, for data-warehousing. The Government recognizes that citizens must be able to trust electronic transactions, if e-commerce and e-government are to be adopted for widespread use. And for their part, too, departments must be able to trust the provenance, integrity and authenticity of data arriving through electronic channels if they are to use them for sensitive matters, such as assessing tax, calculating social security entitlements or sentencing convicted criminals. Data security and protection is seen, therefore, as a key issue in the Government’s e-government strategy. The Government has unequivocally committed itself to effective data protection principles (Prime Minister and Cabinet Office, 1999) and has passed a new Data Protection Act (1998), based on the EU Data Protection Directive, but this is a far cry from being confident that principles and laws are well understood and consistently implemented across the whole of government. The Government is committed, therefore, to developing more detailed codes of practice on data privacy, which will apply to all government organizations and their partners, including the commercial information services companies which are heavily involved in the delivery of electronic services and which are thereby being trusted with a huge amount of personal and commercially exploitable data.

These commitments and initiatives are important and valuable but, as always, the equivocation is in the detail or, in this case in the specific trade-offs between achieving the objectives of e-government and complying with general principles of data privacy. How these trade-offs occur is critical to the whole e-government enterprise, for it is abundantly clear that data-
sharing and exchange are widely thought to be the sine qua non for reductions in internal paper-handling costs that are promised to governments. Data-sharing and data-matching are also fundamentally implicated in fulfilling key policy aims of third-way government, particularly the reduction of fraud in the health and social security systems and the reduction of crime. For example, data-matching between the social security system, local authorities and the Inland Revenue is claimed to save about £73 million a year in increased fraud detection (Department of Social Security, 2001: 47) and so the powers of these departments to share or match data were therefore substantially extended in the Fraud Act, 2000 and the Health and Social Care Act, 2001. Data-sharing between public authorities is also thought to be important in harnessing appropriate intelligence for reducing crime (Home Office, 2001) and the Government has therefore created new data-sharing powers and duties in the Crime and Disorder Act, 1998 as well as in its new anti-terrorism law.

At the time of writing in Autumn 2001, the British Government was still grappling with whether and how the benefits of data-sharing can be reconciled with protecting privacy and maintaining trust, on which (it thinks) the success and take-up of e-government so critically depends. In the Autumn of 2000, the Minister for e-Government asked the Performance and Innovation Unit of the Cabinet Office to run a special project on data-sharing and privacy. This project went some way in laying bare the ramifications of this issue but, a year later, the report has yet to appear, reflecting, no doubt, the still-unresolved nature of the dilemmas it presents. It is therefore not yet clear whether government will be able to find a generally acceptable path between extended data-sharing, data protection and data privacy. What is obvious is that this is a slippery one for the government to tread and that short-term political pressures may well encourage short cuts. As Raab (2001: 54) has recently written:

> Enjoining a practical . . . concern for data protection across a wide landscape of organizations and processes may pose a test . . . There may be pressures in the other direction that prove to be irresistible given the higher-profile governmental ‘mission’ to make the UK a good place to conduct e-commerce and to create e-government to a tight schedule, whilst necessarily involving a vast array of participants, including ‘partners’ across the central/local divide and across the public/private boundary.

As Raab also notes, the ‘irresistibility’ of these pressures is not being effectively countered either by strong parliamentary pressure or by a clear understanding of data protection principles within the departments themselves. We can point, for example, to the low visibility of data protection in discussions before the House of Commons Public Accounts Committee on the National Audit Office’s Government on the Web report (Public Accounts Committee, 1999–00) and the Public Administration Committee’s evidence and report on online public consultation (Public Administration Select Committee, 2000–1).

The governance of e-government

What is the impact of e-government on the structure and distribution of power in government? It is difficult to agree with those who believe that the shift to network technologies will be associated with a looser, more decentralized style of governance. The commitment to e-government, particularly to the 2005 target, represents an expression of political will, requiring a sustained assertion of power by the centre of British Government, one that appears to run counter to the well-established academic thesis that British Government is being ‘hollowed-out’ (Rhodes, 1997).
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thesis holds, among other points, that effective decision-making power lies mainly in departments and their associated policy communities (Smith et al., 2001). It argues that the power of the Prime Minister is heavily circumscribed and contingent, and that the 'core executive', especially the Cabinet, is no more than an arena in which inter-departmental competition for power and resources is acted out. In apparent contrast to this thesis, the commitment to e-government in particular, and to modernizing government in general, is closely and personally associated with the Prime Minister and is being driven strongly from within the Cabinet Office. As we have seen, the e-government strategy was originally developed by the CITU, the Central IT Unit of the Cabinet Office. CITU started life in 1995 as a small, low-profile unit of less than a dozen staff. It has now been absorbed into the high-profile Office of the e-Envoy (OeE), the government's ambassador for e-government and e-commerce who now has an office of around 200 staff at his disposal. The OeE also has in place an extensive set of framework policies to which all parts of government (including local authorities) are expected to adhere, each department has been required to define its own strategy for 100 percent availability of ESD, and progress towards this target is being closely monitored, with reports to Cabinet every six months.

This appears to reflect a strong assertion of political power by the core executive, and so it is. However, the implementation of e-government is being managed in ways that also recognize the power of government departments, the decentralized nature of the British system of governance and the critical external dependencies into which government is being led. Most important of all, perhaps, the Treasury has established additional financial incentives for investing in e-government, including a Capital Modernization Fund to which departments can bid every year for projects that support the development of cross-cutting approaches to service delivery. The core executive has also taken steps to build political support for e-government by attempting to manufacture a purpose-built policy community across all departments and all tiers of government. A group of some 40 senior officials, including a representative of local authorities, has been charged with acting as Information Age Champions, promoting the information age within their own departments and working collectively for e-government more broadly. At the political level, the Information Age Ministers Network brings together a group of 18 ministers from 15 departments, all concerned in various ways with e-government and e-commerce. The Government is also acknowledging its growing dependence on a wide range of external commercial suppliers, including hard and software suppliers, facilities management companies, information services providers and authentication authorities such as banks, by welcoming their influence in e-government policy. Thus, we are seeing the emergence of a network of policy forums, such as:

- the **Alliance for Electronic Business**, a group of five umbrella organizations, including the Confederation of British Industry and the Computer and Software Systems Association, set up in 1998 specifically to influence information-age policy;
- the **Information Age Partnership**, a group composed of high-level officials from ministries and government agencies, on the one hand, and representatives of over 30 digital-age companies, on the other;
- **UK GovTalk Group**, a Cabinet Office sponsored group composed of leading information-age policy departments and industrial consortia charged with agreeing data standards for use throughout the public sector, especially in conjunction with UK Online.

In addition, there is a plethora of working groups set up for more specific purposes such as negotiating the government interoperability framework and liaising with international forums such...
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as W3C, the international body charged with establishing common technical standards for the World Wide Web. In other words, faced with the need to establish a clear policy lead and to drive it through a complex and fragmented system of governmental organizations and private interests, the British Government is resorting to the classic strategy of incorporating key actors. What is unusual is that incorporation is not only being attempted vertically — with external interests and other tiers of government — but also horizontally, across the boundaries of departments and policy sectors.

It can be seen, then, that the British Government has a clear strategy and strong machinery in place to bring about substantial shift towards e-government, albeit one that involves a large number of players and therefore needs careful political management. The same cannot yet be said about other dimensions of e-governance, for example policy-making. Here some movement is afoot, but, as we will see in the next section, with more questionable clarity and political support.

ICTs and policy-making: towards a knowledge management approach

The Government’s White Paper, Modernising Government (Prime Minister and Cabinet Office, 1999), specifically mentioned the need to focus more than previous reform initiatives on policy-making and analysis as well as on public services management. It also made a special point of advocating the enhanced use of research and evaluation. Policy must be ‘evidence based’ (Centre for Management and Policy Studies, 1999). In consequence, there is a growing interest in British government in harnessing and pooling information for policy-making.

Just as in the early 1990s ‘business process re-engineering’ supplied much of the official discourse through which e-government has subsequently been shaped, so ‘knowledge management’ offers a formative discourse for the present decade (Prusak, 1997; Davenport and Prusack, 1998). Its influence is already detectable in British government. For example, the report of the recent peer review of the Cabinet Office argued that the meaning of coordination is changing in the 21st century. As well as resolving issues and building consensus, the role of the ‘core executive’ is to add value by capturing, distilling and disseminating ‘knowledge’ across government (Cabinet Office, 2000: para.5.1.2). There is at present considerable activity aimed at working out how government can be more knowledgeable about what it knows, and how it can harness its knowledge more effectively. This activity is uncovering complex organizational and cultural issues; it also raising serious questions about the informational infrastructure of government and the principles on which it is built.

Flexible data management for policy-making

These questions are clustering into two main sets of concerns. The first concerns the extent to which appropriate information infrastructure is in place to support evidence-based policy. The New Labour Government’s policy initiatives are explicitly oriented to finding out ‘what works’; and considerable energy is being devoted to devising benchmarks and indicators to measure and demonstrate the impact of planned government interventions. Recent initiatives in social policy are spawning an ever-growing number of targets and indicators: for example the government’s anti-poverty and social exclusion initiative (Department of Social Security, 1999) requires the systematic monitoring of over 40 different indicators and its plans for neighbourhood renewal (Social Exclusion Unit, 2001) many more. But these demands are being generated by politicians without a clear understanding of how easy it will be to feed the policy beast with ever more data. There are several barriers to providing more and better data to support evidence-based
government. First, there are some policy fields in which government simply does not collect relevant data or does not possess the tools to exploit those it collects. Partly because of worries about data privacy, the UK does not, for example, have a consistent, geographic referencing system enabling the integration of geodemographic and economic data at very small neighbourhood level (Performance and Innovation Unit, 2000b; Social Exclusion Unit, 2000).

Second, compared with certain other countries, the UK government has not invested heavily in harvesting data residing in its administrative systems (Performance and Innovation Unit, 2000b). For reasons that Taylor and I discussed previously (Bellamy and Taylor, 1998a), government has found it hard to justify resources for informing, as opposed to automating, public services and the same business logic applies to informing policy-making. The upshot is that capturing and releasing information for managers and policy-makers has been accorded low priority for decades. Computing projects have been subject to investment appraisal techniques that look for projects promising clear business efficiencies and reject projects yielding less tangible operational benefits, such as harvesting and analysing even basic information residing in transaction or customer files. A case in point is that facilities for analysing its ‘customer base’ — that is, identifying the demographic make up of claimants for different kinds of benefits or the nature and volume of their interactions with different parts of the department — were jettisoned from the benefits processing systems installed in the Department of Social Security in the late 1980s and early 1990s, because they would have delayed computerization of social security administration. They would thus have undermined the business case for investing in new computer systems.

Third, even when the data exist in useable form, there are probably high institutional and legal barriers to joined-up information flows across departmental boundaries (Performance and Innovation Unit, 2000c). This is coming to be seen as an increasingly important problem, because of the current emphasis on ‘joined-up’ approaches to issues that cut across departmental portfolios. Prominent examples of cross-cutting policy fields include social exclusion, developing services for children and young people, crime reduction and intervention in deprived neighbourhoods. For example, a report of 1998 highlighted the lack of knowledge about social conditions in disadvantaged areas (Social Exclusion Unit, 1998), a problem that a later study found to be compounded by low levels of data-sharing between government agencies. For these reasons, there is increasing interest in exploiting data more flexibly and effectively, for example by data-matching between large datasets or pooling social survey and administrative data. Task forces have been set up to look at such issues as developing a geographic referencing system capable of application at the micro level and establishing common identifiers across datasets. These task forces have also been asked to consult with a wide range of stakeholders, such as social researchers and analysts (PIU, 2000b). Consultations are also taking place with the Information Commissioner on the compatibility of policy analysts’ needs with generally accepted principles of data protection. In particular, much will depend on the technical feasibility of generating useful secondary datasets from primary data held in different kinds of administrative systems, without compromising either their integrity or data owners’ privacy.

E-governance tools: the knowledge network

A second set of issues concerns the development of electronic tools for policy-making. Governments were among the first users of tools such as linear programming, expert systems and computer models. More latterly their enthusiasm for this kind of technical innovation seems to have waned (6, 2002). In particular, the British government has shown little interest in using ICTs for
cooperative working or knowledge-sharing. Again, this is beginning to change, with the establishment of the Knowledge Network. The Knowledge Network was launched in October 2000 as a high-profile exercise in knowledge-sharing and is eventually planned to be expanded across the whole of government. The Knowledge Network is being developed by means of a phased project, which — over the course of the next five years or so — will network information in departments’ existing systems and support collaboration and cooperation, especially across organizational boundaries. Some kinds of information on the Knowledge Network should also be publicly available via the UK Online Portal. When it is completely fully developed, the Knowledge Network will provide ministers and civil servants with real-time access to a wide range of network and information services such as the following:

- access to government statistics and official information;
- access to working papers and policy documents;
- facilities for interdepartmental correspondence; and
- support for online policy communities and special interest networks.

One of the first Knowledge Network projects, for example, provided regionalized ‘facts and figures’ for a number of departments with responsibility for the regions. A second project provided online support for the Information Age Ministers Network mentioned earlier and yet another provided facilities for parliamentary clerks to process their work electronically and share good practice (Office of the e-Envoy, 2001b). In such ways, the Knowledge Network is seen to have considerable potential for ‘modernizing government’. By helping civil servants to communicate more easily and share information more flexibly, it will provide a widely available infrastructure for joined-up working, for evidence-based policy-making and for cross-cutting projects. It should also help to enhance the public dissemination of information, by enabling information to be regularly updated and tailored to specific audiences, such as people living in defined localities or belonging to particular client groups.

Reactions to the Knowledge Network have been mixed. The Blair Government is renowned for its news management skills, and for an excessive preoccupation with political spin. Not surprisingly, therefore, there is some concern that the Network will simply help ministers manage news more effectively and that information will be skewed to serving government’s political ends. This worry is reinforced by accusations that departmental press officers have been politicized under both the present and the previous administrations. Much will therefore depend on who controls access to, and content carried by, the Knowledge Network. In the meantime, it seems to serve a real need among civil service desk officers. The review of Phase I found considerable enthusiasm among civil servants, and encountered several demands from organizations in and around government for help in setting up their own internal knowledge networks.

**Conclusions**

It is clear that a decisive shift towards informating government has occurred mainly in relation to ESD, especially in those sectors where e-governance has attracted strong, political leadership and meets high-profile political needs. It has been shown elsewhere, for example, that e-governance has hardly impinged on the British Parliament (Bellamy and Raab, 1999) and the
present article shows that it is only just beginning to impinge on policy-making and evaluation, and then only for purposes dear to New Labour hearts. But it shows, too, that technology-enabled changes in service delivery arrangements can open up new ways of relating to service users which may well be significant in broader policy terms. In particular, it points to interesting synergies between Third Way approaches to the role of the state and information-age government as the latter is currently understood.

The outline strategy for e-government in the UK was developed in 1994–6 by a small group of enthusiastic officials in consultation with external commercial suppliers. It was taken up by New Labour because it fitted well with its broad modernization theme and because it supported specific policy aims. How far and quickly this strategy will now be implemented depends on the extent to which politicians’ stated will and intentions can be driven deep into government, from the core executive outwards and downwards. This article has described how the British Government has deliberately created horizontal organizational networks at the highest levels of government to provide managerial clout. It shows, too, that, in some sectors of government, at least, the shift to e-government is going with the grain, in that it offers departmental managers real benefits. In particular, it offers them flexibility to reorganize service delivery arrangements, because it promises to liberate service delivery from the constraints imposed by information silos. In the case of social security, for example, e-government fits with long-standing policy aims to move towards a client-group approach. In general, the increasing focus on e-government is encouraging better understanding of the ways in which the policy objectives of politicians have been constrained by the limitations of information infrastructure. The paradox of e-government, however, is that it challenges taken for granted assumptions about service delivery arrangements as well offering an immanent critique of the informational support for policy-making, but it is not yet entirely clear whether new arrangements will really be feasible, especially in the short term. There are still a number of important political problems to be overcome. The most obvious problem is that the British Government believes that the benefits of e-government can only be achieved if there is wide dissemination of information-age technologies, and we have seen that its targets for e-government and e-commerce are both thought to depend on widespread dissemination of user-friendly technologies capable of providing near universal access to the internet within a very few years. We have also seen that intended changes in service delivery arrangements and important reorientations of social policy, as well as the much heralded shift to evidence-based government, all depend on significantly increased capacity to join-up information flows and share much more data across the hitherto impermeable boundaries of systems and organizations. Joined-up information management requires, in turn, that policy-makers, service managers and service users alike all trust — and are given good reason to trust — the security, integrity and privacy of electronic transactions and, as we have also seen, this must still be in doubt. Finally, we have begun to see in our discussion of the British Government’s Knowledge Network that new ICTs must be regarded not only as process technologies capable of new types of transactions, but also as ones that carry new types of content. As government’s capacity for managing and presenting information grows along with the growth and flexibility of web-based technologies, so we can also expect growing tension over the control of the content and presentation of information to be put in the public domain. These, then, are the issues over which the future of e-government is still to be fought.
Appendix 2: Knowledge Management in Government Cases

Notes

1. These documents, together with all the supporting framework documents and departmental e-business plans, are available on the website of the e-Envoy’s Office, at www.e-envoy.gov.uk

2. A discussion of electronic democracy innovations in the UK and elsewhere can be found in the special issue of Parliamentary Affairs 52(3) July 1999.

3. The minutes of the steering group of this project are available on the website of the Performance and Innovation Unit at www.cabinet-office.gov.uk/innovation/2000/privacy

4. The structure and functions of the Office of the e-Envoy are set out on the website mentioned earlier.

References


Appendix 2: Knowledge Management in Government Cases


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Case 2

KM at the Virginia Department of Transportation*

Maureen L. Hammer, PhD, Director; Virginia Department of Transportation KM Division

With about 9,200 employees, the Virginia Department of Transportation (VDOT) is one of the three largest state agencies in the Commonwealth of Virginia. Virginia has the third-largest state-maintained highway system in the United States. The VDOT is responsible for the construction, maintenance, and operation of the roads, bridges, and tunnels in the state's 58,082-mile system. The agency has nine district offices, which oversee construction, maintenance, and operations within the designated geographical area. The districts are further divided into forty-two residencies and two district satellite offices and also staff an area maintenance headquarters in each county. The VDOT central office headquarters is located in Richmond and has thirty-five operational and administrative units. The knowledge management division is part of the central office but is located in Charlottesville, in the geographical center of the state.

In the mid-1990s, the agency lost experience and valuable institutional knowledge following a statewide workforce reduction that offered early retirement to long-term employees. To mitigate the loss, the agency hired former employees as contractors to continue the work. Today, about 28 percent of the current employees are eligible for retirement in the next five years and the former employees hired back as contractors are approaching second retirements. To prevent a recurrence of the knowledge loss, the agency instituted a knowledge management division in late 2003 to address critical knowledge identification, collection, organization, and dissemination.

When Philip Shucet joined VDOT as the new commissioner in 2002, he introduced the concept of two new incubator programs to address the intellectual assets of the agency, knowledge management and the learning center. His expectation was that the KM program would address the identification and sharing of critical institutional knowledge, and the learning center would ensure that the organization would incorporate that knowledge and emerging core competencies into training and learning opportunities. The KM division was established in the spring of 2003 and a director was hired in November of that year. Due to a hiring freeze in state government, hiring for additional positions in the division was put on hold for six months. As the new director came from outside the agency, the chief of technology, research and innovation, Dr. Gary Allen, assigned a research scientist and long-term employee, Bill Bushman, to temporary duty with the new division to act as a guide to the agency for the new director. The research council, located in Charlottesville, provided administrative support. The KM division was given two directives: (1) establish a community of practice for the project managers of the major construction projects, and (2) take baby steps but make this happen quickly.

Goals of the KM Division

The goals of the division are to preserve and make accessible institutional knowledge and memory, to establish an environment that supports knowledge creation and sharing, and to help the organization know what it knows. The objectives are to identify knowledge experts and to support the redundancy of knowledge within the agency. These are accomplished through knowledge mapping and the establishment of communities of practice. The agency has included measurements for these activities in its strategic plan for 2006-2008. The division will map the knowledge network of one district and will double the number of communities to twenty.

Original Community

As directed by the commissioner and chief, the first community was to comprise the project managers of major construction projects, such as the Woodrow Wilson Bridge, the Springfield Interchange, Pinner's Point in Hampton Roads, I-81, and the Coalfields Expressway. The value of these projects taken together was approximately $8 billion. An initial meeting with these seventeen project managers was held in early December 2003, during which the commissioner stated that he truly believed that just bringing them all together in one room to talk with each other about what was happening in their projects, their issues, their concerns, and lessons learned would result in tremendous savings for the agency. He also stated that due to the project managers' heavy schedules and responsibilities, the community would need to be established electronically as they did not have time to meet in person on a regular basis. During the meeting, the project managers provided brief overviews of the construction projects to acquaint each other and the new knowledge management officer with the current status of the projects. The group agreed to meet again in early 2004 for a community kickoff, at which time the technology platform would be introduced.

As the agency did not have software for online communities at that time, the information technology division developed an interim solution for an online discussion board using Microsoft Office folders, which would allow the participants to send e-mail messages. The intent was to provide a forum with which project managers were familiar and that would allow them to participate while performing a familiar activity, corresponding through e-mail. Knowledge management also partnered with the project management office to establish a taxonomy to organize the discussion and to ensure that lessons learned were captured in a consistent way.

There were a few difficulties in establishing the discussion forum, however. In February 2004, the system went live and was introduced to the community during another face-to-face meeting. An initial topic was selected and the knowledge management office populated the forum with notes from that meeting. During the next two months, not a single community member used the system despite repeated requests, reminders, and encouragement. What the knowledge management director had not realized was that members of this group were new to their positions and had never had consistent interaction, nor were they necessarily familiar with each other. A successful community requires trust between members who are knowledgeable and have expertise in their field. Discussions should improve practices and increase knowledge, not criticize.

Trust plays an important role in the sharing and use of knowledge. If people believe they will benefit from sharing their knowledge, either directly or indirectly, they are more likely to share.
Whether people use the knowledge of others depends on whether they know and trust the source of the knowledge (KM Working Group 2001, 2).

As Edwards and Kidd (2003, 133) have noted, "knowledge sharing, even without any kind of formal system, inevitably raises issues of trust." Ribiere and Sitar (2003) have suggested that dialogue and communication are the basis for all knowledge sharing because they facilitate the development of social relationships, and if people are to start talking freely without the fear of becoming vulnerable, trust is absolutely necessary. The willingness to share what is known requires the presence of trust.

Trust involves a belief that the source and recipient will be respectful of the knowledge exchanged and that the exchange will be beneficial to each. It also encompasses a belief that the source of knowledge is competent and reliable. According to Abrams et al. (2003, 65):

In the context of knowledge creation and sharing in informal networks, research suggests two dimensions of trust that promote knowledge creation and sharing: benevolence ("You care about me and take an interest in my well-being and goals") and competence ("You have relevant expertise and can be depended upon to know what you are talking about").

In our early program, participants perceived the initial system as "clunky and unfriendly," and did not feel that they had time to learn how to use it. A meeting was called for June, at which time all the participants were to be brought together to discuss the lack of use of the system and to continue discussions on lessons learned to that point. The KM director admitted to the project managers that the attempt to establish an online community had been a complete failure. The ability and freedom to admit to this mistake established for the community that it was acceptable to say that something could have been approached differently. From this we learned a lesson that could be used in the future, which later helped establish trust and demonstrated what could be shared.

The decision was made for the full group to meet quarterly for similar discussions. The knowledge management office would conduct interviews of specific project managers prior to the meeting to collect lessons learned that the group would review prior to publishing them to the agency at large. The lessons learned by the knowledge management division included: (1) know the participants, (2) develop the community of practice to suit them, (3) participants need to know and trust each other to share knowledge, and (4) although communities can be supported by online interaction, they require periodic face-to-face meetings.

Office Expansion

The hiring freeze was lifted in 2004 and three new project managers were hired. The office now had four full-time and two part-time employees, along with administrative support staff. A list of possible knowledge management projects had been gathered and these projects were assigned to the new members of the team, who quickly began to implement new communities. There were also parallel activities in knowledge mapping: identifying experts, identifying knowledge held by experts, identifying knowledge gaps or potential gaps, and promoting and defining knowledge management within the agency. In addition, the division welcomed the addition of the VDOT library. The
expertise and skills of the librarians would be utilized by knowledge management in organizing the knowledge collected to ensure that it would be retrievable.

Communities and KM Projects

By the end of 2004 there were four active communities, two emerging communities, a lessons learned collection project, and three active knowledge mapping projects. By the end of June 2005, ten communities, three lessons learned collection projects, and four knowledge mapping projects were functioning, along with a waiting list of proposed communities and mapping projects. The division had doubled its activities in six months.

Each community is unique in its purpose and outcomes. Membership in communities varies to include:

- Employees within the same division or functional area,
- Employees who have the same role in different geographic areas,
- Employees who have different roles but perform related functions,
- Current and former employees addressing an identified knowledge gap, and
- Employees of VDOT working with employees of other agencies or organizations.

The original community is still active and developing lessons learned that can be shared within the agency. It is currently organizing an interactive conference to promote and share ideas on project management within the agency, thus expanding the reach of the lessons learned and best practices. Three communities evolved out of the original community as a result of issues raised and lessons learned during community meetings and interviews of the project managers for construction projects. These communities are looking at ways to improve cross-functional knowledge sharing, promoting the practice of project management within the agency, and establishing best practices for quality assurance and quality control.

To improve cross-functional knowledge and the promotion of project management, the construction project managers teamed with representatives of the location and design and structure and bridge divisions. After two meetings and the formation of a subcommunity, the group realized that the goal was to establish regular feedback between the design and implementation of a construction project using a project management approach. This shared feedback leads to the development of lessons learned and best practices that can serve as resources for future projects in support of the agency goal of delivering projects on time and on budget with quality. An additional outcome was the formation of a constructability issues panel discussion between three representative project managers and the location and design division statewide. This panel discussion contributed to lessons learned and the sharing of best practices. The panel shared what worked well as well as challenges faced during construction that directly related to the design.

The second community that developed out of the original community was established within the right of way and utilities division to address the pending knowledge loss that would result from the retirements of about 40 percent of its employees and 90 percent of its managers. Knowledge management has partnered with human resources to work with this community to establish what
skill sets will be needed in the future, how to develop these skills, and how to hire for these positions. This endeavor is a pilot for how the agency will address the same issues with other divisions. The community also established quarterly project days to discuss current and upcoming projects and how to best use existing staff to address needs, including assigning employees across multiple districts when needed. When the community brought the ideas for addressing the anticipated knowledge loss in front of the district administrators committee, the response was unanimously positive and supportive. Leadership was pleased to have the community of practice proactively identify the problem and recommend a solution.

The third community that was developed out of the original community involved construction quality managers with the anticipated outcome of developing best practices and improving day-to-day operations. The agency is facing a serious shortage of experienced inspectors, so the community established a quarterly statewide project day to share information and to break down barriers in districts. The community presented an idea for a best practice that will enable inspectors to spend more time in the field and to produce statewide consistent records, which has been enthusiastically endorsed by the district construction engineers committee.

One of the construction project managers invited knowledge management personnel to participate in a "lessons-learned" meeting on a public-private partnership construction project. This participation led to the formation of a group to look at all lessons learned in this new type of project and to close the loop by developing a feedback process and identifying lessons learned that could be a knowledge resource for future projects. The lessons developed from this project are serving as the basis for the development of a repository and taxonomy for the organization’s intranet.

Another community was established to address an identified knowledge gap in the rehabilitation, dismantling, and relocation of historic truss bridges. This community includes retired employees who hold the missing knowledge and will result in published best practices that will be used throughout the country. This community was interested in supplementing in-person meetings and interviews with an online team room.

Two more communities were developed to determine best practices for a new function for the agency, intelligent transportation systems, and to share lessons learned across the state. One community was formed to look at what the core functions of the smart traffic centers were as part of a research project. A member of the group expressed his satisfaction with the process by saying that the community was the most useful and rewarding activity of his professional life as it allowed him to learn from others, to meet with his peers, and to be creative in problem solving. The other community was developed for the entire intelligent transportation system function and the focus there is to set up an online environment in which members can share lessons learned and best practices and can ask questions.

A community linking the agency with representatives of cities and towns within Virginia is in the developing stages, and a sub-community has developed that provides the members with the opportunity to ask questions of the experts in managing their own construction projects during round table sessions. This has led to cities' beginning to use each other as resources.
Knowledge Mapping Projects

Knowledge mapping projects include identifying and capturing the knowledge held by experts who are eligible for retirement, identifying lessons learned and best practices from long-term employees to be used by new employees, and identifying and capturing knowledge held by a sole source. An example of a sole source knowledge mapping is the highway performance monitoring system, a process that affects federal allocations for state road construction but that is currently only known by three people, all of whom are eligible for retirement. Lessons learned are captured for new and established functions for the agency both within communities and external to communities. An example of this would be the asphalt forum, which is attempting to collect lessons learned and best practices over the past fifty years from both within and external to the agency.

The knowledge management office is developing an online team site for the forum. The division plays a major role with the intranet to ensure that it is a knowledge-sharing tool and to establish a taxonomy that will allow for quick retrieval of needed knowledge and information. Online communities have also been established and are facilitated by the division on the agency’s intranet and learning management system.

Research to Identify Networks

The Virginia Dar recently sponsored a study to identify the types of networks within the agency in which employees participate, to determine what knowledge is shared, and to determine what roles employees play within the networks. Results of this study were then used to design new knowledge management projects within the agency and to identify what agency actions were needed to support knowledge sharing. The goal was to identify and make available expert, internal knowledge and external knowledge on the intranet so that an employee can search on a topic and have a retrieval that encompasses all three knowledge types. This allows the user to select the type of knowledge most needed or with which they are most comfortable—regardless of whether it is a written document or access to an internal or external expert.

The inclusion of experts in the system was necessary because not all knowledge can be codified and because people do not know what they know until they are asked a specific question. Study results were grouped by years of service with the organization, as follows:

Employees with Thirty or More Years of Service

These employees indicate having active roles in networks with strong ties (frequent interaction) with colleagues in the same geographical location as themselves, with counterparts in other geographical locations, and with consultants. Strong networks share institutional knowledge and experience and inform employees of who knows what. These long-term employees also participate in networks with weak ties (infrequent interactions) as peripheral members with employees within the same functional area in which knowledge is shared. These employees are the experts who are consulted or who offer knowledge and advice upon request. Employees became aware of these networks through mentors and as a result of long tenure with the agency. There was management support for regular face-to-face interactions with contacts and for informal knowledge sharing. As contacts retire, the networks are dissolving and interaction is decreasing. Long-term employees have a strong desire to share institutional knowledge, expertise, and
experience with newer employees, but do not perceive that management has allocated time or budget resources to support the activity in the last decade.

**Employees with Twenty Years to Less than Thirty Years of Service**

Long-service employees have active, central, and spanner (links between networks) roles in networks. Moreover, they have forged strong ties with colleagues in the geographical area, with jurisdictions, and with consultants. These strong networks share experience, provide referrals, and inform employees of who knows what. These employees also participate in networks with weak ties, as peripheral members with previous coworkers and with employees in the same functional area in which relevant knowledge is shared. Employees became aware of networks through family members who also worked for the agency, through on-the-job training, by invitation, through involvement in special projects, or because of reputation. There was management support for regular face-to-face interactions with contacts and for informal knowledge sharing during the early years with the agency but that diminished since the 1990s. Participation supports these employees in knowing the function, providing institutional knowledge, and informing them of who does what. As networks dissolve through retirements, position changes, and departures from the agency, employees lose contacts and knowledge is limited to the immediate functional area. Periodic, temporary networks are relied upon. Employees perceive that management support for participation has decreased dramatically.

**Employees with Ten to Twenty Years of Service**

These employees indicate having active and central roles within networks, with strong ties with friends, colleagues in the same geographical area, localities, consultants, and those on Internet forums. Strong networks share career information, functional knowledge, how-to knowledge, and interpretations of explicit knowledge and inform employees of who knows what. The employees also participate in networks with weak ties in central roles, with previous coworkers, with employees in the same functional area within the agency, and with counterparts in other geographic locations in which functional, technical, historical, and cross-functional knowledge is shared. There are employees within this tenure group who are isolated from networks, primarily by choice. Employees became aware of networks through family members who also worked for the agency, mentors, job requirements, tenure, predecessors, or participation in special projects. There was support for participation in networks if required by the job or encouraged by mentors, although support has decreased since the mid 1990s due to budget and staff cuts. Management is focused on getting the job done today. Participation supports these employees in streamlining work processes, sharing workloads, knowing the questions to ask, and demonstrated value of expertise. Dissolution of networks has resulted in lack of communication, loss of contacts, lost institutional knowledge, and employees' no longer knowing who to ask.

**Employees with Less than Ten Years of Service**

These employees indicate having active or central roles within networks, with strong ties with friends, immediate coworkers, and previous coworkers; across functions when required by the job; with consultants; and through Internet forums. Strong networks share career information, functional knowledge, technical knowledge, and institutional knowledge. These employees also participate in networks with weak ties, in peripheral or spanner roles with counterparts in other geographic locations, localities, vendors, and colleagues in professional associations. Knowledge shared
within networks with weak ties includes functional, institutional, and professional knowledge; lessons learned; and informing the employee of who knows what. There are employees who are isolated but wish to be more involved. Isolation can be attributed to a fear of providing wrong information as well. Employees became aware of networks through family members who work for the organization, the engineer trainee program, previous experience with networks, long-term employees, managers, and by invitation. Employees perceive there is management support if required by the job or if it results in improved technical knowledge. Lack of support is attributed to the unavailability of budget allocations to support networking. Participation in networks eases work assignments. Dissolution of networks results in lost institutional knowledge, not knowing who to ask, and a low awareness of organizational issues.

This study revealed that strong tacit knowledge networks in this state agency are primarily restricted to local groups due to a lack of time, budget restrictions, reduction in staff, high workload, the weight of paperwork, rules and regulations, and lack of management support. The assumption is that employees would share more if more time and resources were allotted to support the transfer of knowledge. Networks that do go outside the local area, primarily weak networks, result in more efficient and effective work practices. However, because these are weak networks with infrequent interaction, the agency does not fully benefit from the collective knowledge of its employees.

### Effects of Organizational Culture

The participants perceive that the organizational culture is one of a command-and-control approach, which interferes with knowledge sharing and transfer through networks. "Culture embodies all the unspoken norms, or rules, about how knowledge is to be distributed between the organization and the individuals in it" (DeLong and Fahey 2000, 118). Knowledge creation and sharing is also affected by this organizational culture. "An organizational culture that enforces a policy of command and control to create an order seldom provides opportunities to create knowledge" (Bhatt 2000, 1).

Status as a government agency also impedes network participation, as employees are often overloaded with paperwork, rules, and regulations. According to Chiem (2001), unlike workers in private enterprise, government workers must complete paperwork for even the simplest tasks—a requirement that can potentially hamper workers' productivity and create an institutional tendency to perform only the minimum job requirements. Chiem also suggested that presenting knowledge sharing as a way to make jobs easier can assist in making KM practices appealing to government employees.

In the DOT study, employees with less than twenty years of service do perceive knowledge sharing as making jobs easier. Employees do not know what to share or what is known until the opportunity to network with other employees arises and through discussion the knowledge is revealed. There is a perception that talking is not productive; this study reveals that it is. "The non-information sharing culture of many government agencies is perhaps one of the greatest barriers that many agency directors will face" (Auditore 2003, S4). The KM Working Group of the Federal Chief Information Officers Council (2001) identified several reasons employees do not share knowledge: (1) people may not know what they know, (2) they do not know how to share or with whom to share, or (3) sharing may be seen as too difficult or time consuming.
The DOT study found that lack of time, failure to recognize employees, and rules and regulations produced by legislation all impacted networks. Similar information was found in a study of the U.S. Social Security Administration by Rubenstein-Montano, Buchwalter, and Liebowitz (2001), in which they identified the following barriers to sharing knowledge:

1. Lack of resources;
2. Failure to recognize individual contributions;
3. Assignment to leadership positions not based on merit or experience;
4. Hierarchical organizational structure; and
5. An organization driven by legislation.

The strong networks found to exist in the Virginia Department of Transportation were most often local, with few networks reaching across, geographical or functional locations. A rationale for this finding was suggested by Ruddy (2000), who found that a great deal of knowledge in an organization is undocumented and therefore isn't easily available to everyone. It may be shared among a few individuals or within local groups, but it rarely migrates outside those circles. This is especially true for practical know-how, but is also true for the more formal kinds of knowledge that people discover and create every day. This restriction to local sharing of knowledge prevents that knowledge from being accessible to the rest of the organization.

The Impact of Worker Loss and Isolation

In the DOT study results, retirements, failure to retain employees, and reorganizations were all cited as contributors to knowledge loss and the inability to know who to call, a finding that was also seen by Burk (2000, 18):

New staff or staff facing new problems are unaware of these ad-hoc communities and are unable to tap into their expertise. Expertise learned from experience is lost with retirement. Staff turnover and restructuring break down the informal networks to the point where even long-term staff do not know who to call.

Employees with less than twenty years of service may feel isolated (Connelly and Kelloway 2003, 297). Fifteen of the seventeen participants interviewed in the DOT study indicated a desire for more participation in more networks, particularly those that go outside the local area. These finding contradict Chatzkel (2002), who suggested that the main barriers to knowledge sharing in government organizations were the "not invented here" syndrome and personal power issues. Chatzkel also concluded that government employees hoarded knowledge to support the security of their role in the institution-barriers that were not found in the DOT study.

Lack of Management Support

A number of researchers have suggested that management is often unaware—or aware but not providing support or focus—of the role of networks in sharing knowledge across an organization. The literature indicates that management effort and support are required for successful knowledge transfers. Organization leaders have direct control over which activities are rewarded, which
behaviors are encouraged, and how work is measured and valued in an organization, factors that all influence workers' motivation and ability to develop new knowledge (Bryant 2003). It is the organization's responsibility to establish a culture or environment that supports the forming of these networks, both loose and tight, to encourage the sharing of knowledge.

**Implications and Recommendations**

Findings of the knowledge sharing and networking study conducted in Virginia have implications that may be applicable to other organizations, including:

1. Barriers to knowledge sharing are greater than management support as evidenced by time allotted and resources provided for networking;

2. The loss of knowledgeable employees since the mid-1990s through retirements and attrition resulted in dissolutions or weakening of networks through which tacit knowledge was shared;

3. The continuing loss of employees further impedes the sharing and preservation of institutional knowledge;

4. Government employees need the visible and articulated support of management to engage in knowledge sharing;

5. Knowledge sharing results in benefits to the organization through improved processes, shared workloads, and easing of work assignments;

6. Younger employees desire to have the institutional knowledge recorded and made available electronically whenever feasible or to make tacit knowledge explicit; and

7. Long-term employees have a desire to share the knowledge gained over the years.

**Agency-Related Recommendations**

Recommendations resulting from this study for the agency are:

1. Increase management awareness of the value and impact of networks on the work performed;

2. Provide time and budget resources to support employee participation in cross-functional and cross-geographical networks to increase knowledge shared;

3. Develop networks for knowledge sharing;

4. Identify knowledge experts; and

5. Transform tacit knowledge to explicit when feasible and make it accessible electronically.
Lessons Learned

The agency hired a knowledge management director from outside the organization. Although the director had the knowledge and experience to develop a KM program, the new director did not have knowledge of the organization. To address this gap, a long-term employee was tapped to act as a guide for the new director. In this role he explained the history of the organization, the functions, and how they interacted; defined acronyms and terminology that were unfamiliar; and introduced the director to agency employees. As this long-term employee was well known and respected within the agency, this provided the new division with instant credibility.

That temporary assignment evolved into a permanent one, primarily at the request of the employee, who recognized the need for and value of a knowledge management program. The now-permanent staff person was also able to translate this experience into language that was instantly understood by his colleagues. The lesson learned is that an organization needs an experienced knowledge management professional to develop the program and to explain and define knowledge management for the organization, but it also needs the expertise and familiarity of a long-term employee to ensure that the program addresses the unique needs of the organization.

No two communities are alike within this agency. However, all communities were developed to provide something specific that would benefit the organization, whether that is the sharing of lessons learned that leads to cost avoidance, the development of a plan to address pending knowledge loss, the recovery of lost knowledge, or the sharing of knowledge between functions. Communities have an executive sponsor to ensure that participation is supported and that the community will provide the organization with a return on its investment. The knowledge management division provides coordination and organization for the community, facilitation of discussions, and the collection, organization, and dissemination of the knowledge across the agency. The lessons learned are that communities have unique needs and purposes but all must demonstrate value to the organization and to be successful community members need to meet face-to-face periodically to establish the necessary trust to share knowledge.

The knowledge management program was the direct result of the commissioner's initiative and vision, which was shared by the chief of technology, research and initiative. Both actively promoted the program prior to its inception and after, resulting in a willingness of employees to listen and to grant knowledge management the opportunity to pilot several programs. At that point, it was up to the KM team to demonstrate and persuade employees of the value of the program. The lessons learned were that the support of the top executive team was vital, particularly in the early days of the program to ensure that employees were given the support to participate. It was then important to demonstrate value to build grassroots support within the agency. Today, the program has the benefit of both.

To identify the impact of the knowledge management initiatives, participants were surveyed. The following statements by involved VDOT personnel illustrate sharing of lessons learned and current information in the original community:

- I view the reports from other PMs as adding value, as they provide unique real-time information and solutions from the other districts and projects.
Appendix 2: Knowledge Management in Government Cases

- Allows me to see how others deal with issues and alerts me to potential issues.
- Other reports have given me insight into the management of the Virginia Public-Private Transportation Act of 1995 (PPTA) and design/build projects. For me, they have also proven to be a good tool to allow me to think of ways to develop and (at least) try to streamline some of our antiquated practices.
- Review of others’ issues provides insight into issues that could surface on my projects and provides me time to consider them prior to their becoming a crisis.
- The reports are a valuable communication tool in what is happening and just as importantly in what is not. The reports can only help in strengthening the administrative team. We have had limited experience with multiple major projects...the reports keep us focused.

Members of the right of way and utilities community (formed to address the pending knowledge loss that will result from the retirement of about 80 percent of its employees) were surveyed on what value they perceived the agency gained from the community. The following received the highest ratings from the members:

- Ongoing-improved communication/collaboration
- Ongoing-improved processes and/or integration of people, ideas, differing objectives, or needs
- Lessons learned (can be related to projects, processes, or planning)
- Best practices (can be related to projects, processes, planning, or staffing)
- Effective process model for use elsewhere in the agency

The survey also questioned members of the right of way and utilities community on what value they perceived that the knowledge management office brought to the community:

- Effective facilitation of meetings
- Effective communication support (documentary or verbal)
- Collection of important and useful information
- Analysis of information to provide a useful result
- Integration of a working group that respects differences among people, ideas, and objectives or needs
- Neutral perspective-not associated with any specific group
- Access to decision makers
- Understanding of how to increase/improve collaboration
Conclusion

The development of a knowledge management division at the Virginia Department of Transportation has provided demonstrated value to the agency. Understanding of its role and goals has increased and has resulted in increasing support from both management and employees. The initiative is still in its early stages but a plan is in place to address the pending knowledge loss due to the retirements of long-term employees and to make that knowledge available to current and future employees.
Appendix 2: Knowledge Management in Government Cases

References


Appendix 2: Knowledge Management in Government Cases


Case 3

INCENTIVE MECHANISMS FOR KNOWLEDGE MANAGEMENT: 
CASE STUDY IN A BRAZILIAN COMPANY

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The aim of this article is to present a case study of a Brazilian company on which it was developed a knowledge portal linked to some motivating mechanisms and the total decentralization on the creation, dissemination and sharing of knowledge processes. The developed activities, used mechanisms, defined indicators, as well as the achieved results will be presented here.

Introduction

Nowadays, companies have showed a great interest in developing their projects and activities based on their experiences and knowledge acquired through the years (Awad and Ghaziri, 2004). Despite having a clear understanding about the significance of the knowledge management to reach the strategic plans, several mistakes that link its application to the indispensable requirement of an information technology system have contributed for the questioning about its efficiency, which, if taken to the utmost point, may lead to its implantation failure.

The adoption of an information technology solution may contribute a lot to the processes of creation, registering, sharing and dissemination of knowledge processes, however, the required integration among persons is only possible by using motivating mechanisms and actions that incentive and provide the existence of an environment addressed to the knowledge and its dissemination.

Another important issue is related to the definition of objective indicators that may evidence, in an effective way, how much the company's knowledge, as well as its cooperators', is being registered, shared and disseminated and, the most important, bringing financial return to the company (Davenport and Prusak, 1998).

Finally, it should be highlighted the need of sharing not only the knowledge but also its management, whose responsibility should not be limited to a single area of the company. The knowledge management is multidisciplinary and should be present in all disciplines and activities developed by a company (Edvinsson, 2003).

The studied company understood that technology, if properly used, might leverage the processes for knowledge conversion, that is, socialization, externalization, combination and internalization (Nonaka and Takeuchi, 1995). To make it possible, it was necessary to observe the following, three aspects:

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• The strategies for knowledge development should be focused on the creation of mechanisms that allow the professionals to keep contact to one another to create a relationship and not just capture and centralize the dissemination of information.

• The Information Technology efforts and initiatives for the creation of work communities in the company should be followed up by objective and highly disclosed indicators.

• The technological supporting tools should be flexible and easy to use, providing the highest possible autonomy to the members of the work communities.

Through the understanding of these three aspects, a group of professionals indicated by the company has identified the intranet technology as the most adequate means. The intranets do no restrict the access of local users and allow a safe access by authorized users, besides providing an appropriate management of the stored knowledge, always through a simple and universally accepted customized pattern software, the browser.

From the moment a collaborator registers a knowledge on the portal, he receives the title of "Internal Consultant" on that publication subject. Such concept serves as an incentive means for people to register their knowledge. The list of internal consultants is a reference, a consultation source for the project managers that organize their work teams for new projects. Through it, such professional may be identified and consulted, what may result on a request for their services.
In addition, those professionals start to make part of a group of approvers who analyze the registered knowledge and that, afterwards, approve them for disclosure. This is a very important role, as the knowledge should be validated before being made available for consultation on the portal.

**Existence of an Incentive Policy**

The creation of a portal is not a guarantee for the knowledge sharing to occur, as the collaborators should be stimulated to register and disseminate their knowledge. Thus, it will be possible to create a knowledge database that belongs to the whole organization, just opposite of being just individualized in the minds of the employees. The existence of clear incentive mechanisms that help the integration among people is very important for the activities addressed to knowledge dissemination to happen on a natural and pro-active manner (Hersey and Blanchard, 1986). This happens because it performs an important role to make the collaborators to feel like sharing their knowledge to the remainder colleagues.

An interesting way used in the company, that has generated good results regarding people incentive is a bulletin to disclose and highlight the name of collaborators who disclosed and disseminate knowledge.

These bulletins are sent monthly to every employee and provide important information about new registered knowledge developed by their colleagues, what generates a great expectation.
Another initiative considered important to incentive knowledge sharing was the creation of a "touchable" incentive that would motivate even more the collaborators to make part of the knowledge management processes. In order to meet this requirement, the Knowledge Highlight Award was created.

**Knowledge Highlight Award**

The main objective of creating this award is to incentive and motivates the collaborators to register and make available the studies that describe examples of innovation and new knowledge used on the company activities and projects.

Objective selection criteria have been defined concerning the quality and efficiency of the presented studies. The creators of the winning project are awarded a technical trip to attend an engineering and technological innovation international event, with all expenses paid by the company, in addition to the publication of their study on several media vehicles of the company. Each collaborator or group may register a study describing a technological innovation that has brought about cost reductions on the accomplishment of any activity or related to its development time and quality improvement (Mafias, 1999). The studies are registered on the knowledge portal, on which is possible to include descriptive comments, photographs, graphics and video recordings. Afterwards, each study has to be validated by engineering and innovation areas. This validation consists of making a survey of the evidences related to the presented results.

On the latest edition, 40 studies were inscribed and could be consulted on the portal. Afterwards, there was an "audience voting" that took a month, through which the collaborators indicated the most interesting studies according to their experience on projects. In total, 730 votes were registered.
During the second stage of the awarding process, the three most voted studies were analyzed by the representatives of each senior management area of the company, based on some criteria, like: Project Impact, Cost, Time Reduction, Customer Value, Innovation, Applicability and Use of Techniques / Register Quality.

Knowledge Mileage Program

Another developed initiative was the Knowledge Mileage Program through which the collaborators are given "mileages" based on their participation in the activities related to knowledge dissemination. The main objectives are:

- Incentive knowledge sharing among the collaborators;
- Foment the integration among the several areas of the company, as well as to disclose the activities being developed by each of them;
- Promote synergy among the collaborators;
- Develop the collaborators' capacity of making presentations.

The program consists of presenting the proposals by the collaborators. The program committee, made up of employees of different areas, analyzes if the proposed subject is attractive and/or if it allows the arising of discussions among the collaborators. After the matter is approved, the collaborator proposes a presentation and will have a certain period of time to prepare it. At the same moment, a message is sent to all employees of the company to inform them about the event that will take place. The presenter and his colleagues who attend the presentation are given "mileages" based on the following classification:
• Make a presentation about an issue linked to the company: 20 miles
• Make a presentation about an issue not linked to the company: 10 miles
• Attend to a presentation about an issue linked to the company's activities: 5 miles
• Attend to a presentation about an issue not linked to the company: 3 miles

The sum of these points is registered on the portal and the collaborators are awarded as follows:
• Book exchangeable bonus (up to R$ 50,00) -100 miles
• Subscription to a magazine (up to R$ 300,00) -500 miles
• Participation in a course (up to R$ 1,500,00) -1000 miles

Focus on Knowledge Award

With the aim of recognizing the contributions by the collaborators and their respective areas, it was created the Focus on Knowledge Award. The objective of this award is to disclosure the knowledge management concepts by providing a certificate with no monetary value but with a great professional value as it is handed to the employee during a meeting with all senior managers of the company. The award is divided into 6 categories as follows:

1. Author:
Collaborator who was the author of the most part of the knowledge registered on the Portal.

2. Publisher:
Collaborator who has registered most part of knowledge on the Portal.

3. Dissemination:
Collaborator who has most participated in the events of the Mileage Program.

4. Sharing:
Company area that has most contributed for knowledge creation and registering.

5. Audience:
Author of the most consulted knowledge on the Portal.

6. Mention of Honor
Author of the knowledge that was very highlighted on the knowledge portal for containing clarifying registers that may be easily re-used on the next projects of the company.
Integration Events

Another way of increasing the knowledge sharing was the implementation of observing events. They allow the relationship among the collaborators, what makes possible the discussion and exchange of experience (Saint-Onge and Wallace, 2003). The following performed events may be highlighted:

1. Study on the Activity Costs:

Objective:

- Study the technical and constructive procedures that are (or have been) used on the company projects. This enables the exchange of experiences obtained during the development of such activities and the evaluation on the need to implement new methods.

Activities:

- The participants study the cost composition of the activities developed by the company with the aim of analyzing the use of the required equipment and labor, as well as their productivity.
- The participants indicate the professionals, from the operational up to the management levels, who have performed such activities. Thus, it is made the mapping on the existent practice knowledge in the company.
- Meetings are made to discuss the conducted analyses and to prepare the changing proposals for improvement of the studied activities.

2. Project Management Workshop

Objectives:

- Study the methods and procedures for project management used on the company and disseminate them to the remainder areas.
- Exchange experiences made on the project management areas.

Activities:

- Each participant makes a presentation on the difficulties found during the planning of his project, including the main differences between the plan and what has been effectively done and the positive and negative issues about it.
- By the end of the presentations, each participant chooses the three most significant presentations to his professional development. Afterwards, the professional whose presentation receives most number of indications is given the award of participating in the annual event about project management sponsored by P .M.I (Project Management Institute).
3. Technology and Innovation Workshop

Objectives:

- Present and analyze the technologies and innovations that are being studied or have been implemented on the company projects;
- Foment discussions among the teams with the aim of adopting new technologies and innovating processes that generate reduction on cost and/or execution time;
- Exchange experiences during the adoption of new technologies and processes;
- Make feasible the implementation of innovating processes on the company projects.

Activities:

- Each participant makes a presentation on which technology and/or innovation has been identified, including which technical studies and economical feasibility were used as a basis for the acquisition of a certain technology and which actions have been planned for its implementation stage, as well as the explanation on how they have been carried out.
- By the end of the presentations, discussions are carried out with professionals of other areas with the aim of studying the feasibility of applying the presented technology on the remainder areas of the company.

4. Knowledge Seminar

Objectives:

- Reinforce the concepts on knowledge management in the company.
- Discuss the activities developed for the better use of knowledge and already existing experiences of the company.

Activities:

- The professionals who have most contributed to the knowledge inclusion to the portal are invited to make presentations on the reasons that have motivated them to disseminate their knowledge and on the gains reached through their use (financial, quality and time). External professionals are also invited to present the best practices existing in the market.

Some of these events have already been put into practice very successfully. Other ones are still on a project stage, but the most important factor is that their accomplishment makes possible a higher integration among the collaborators, what allows a better sharing of the knowledge existing in the company. The mere accomplishment of speeches would not help the completion of this project since their efficiency is restricted by several reasons, including lack of time.

As a result, one of the basic objectives of organizing such events is to inform the employees about the matters being discussed in the company. Such issue, combined with the meetings
related to it, facilitates the exchange of experiences among the teams of several areas of the company.

It is also highlighted the significance of disseminating important concepts addressed to the creation, register, dissemination and sharing of knowledge not only to the company employees, but also to their families. This demonstrates a commitment to the future and the recognition of the social responsibility that a company needs to have.

**Box of Ideas**

The creation of an innovating environment that allows the free flow of new knowledge and ideas has been also considered an important objective to be reached by the organization. Based on this need, the "Box of Ideas" program has been developed.

The program consists of stimulating the register of new ideas that could leverage better results for the company. Such ideas may be suggestions for improvement of processes, new procedures to be adopted in some of the provided services or even the acquisition of equipment that may not only reduce costs but also improve the quality of the product / developed process.

Small "boxes" are located all over the company on which ideas written by the employees are stored. In addition to the "boxes", it is possible to make the registering of ideas on the knowledge portal.

On a weekly basis, a previous analysis of the registered ideas is made by a group composed of professionals from different working areas of the company. During this analysis, it is verified the possibility of implementing what has been suggested, as well as its relevance to the company.

Afterwards, the idea approved by the group is forwarded to the area that potentially will have the greatest possibilities of making use of the benefits provided by the idea. The professionals of such area make a meeting with the creator of the idea and elaborate a feasibility plan. On that moment, the idea is technically and commercially detailed.

Afterwards, pilot tests are carried out to verify the effective gains and/or improvements that may be reached out. Once approved, the idea is implemented.

For each implemented idea, a percentage value of the amount saved due to the cost reduction and/or generated income is re-passed to the creator of the idea. In addition, the number of hours the employee spent on the idea detailing process and tests are paid to him as overtime.

If the idea is related to the development of a new product, its creator, independently from his hierarchical title is "raised" to manage a new sector of the company that will be in charge of developing and trading the new product.

At the end of year, an event sponsored by the company awards the 10 employees who have most contributed with ideas. They are given a trophy of honor and a dinner with the company senior team, together with his family.
This initiative aims not only the obtainment of financial gains by the company but also to stimulate its collaborators to participate in an effective way in the search for innovating solutions that may align their objective even more, as well as the company ones.

**Indicators Definition**

Another great challenge concerning knowledge management is related to the definition of objective criteria to measure the results reached with its implementation. Such results allow the feasibility not only of the initiatives survival on this area, but also the development and implementation of new ideas and actions that enable the existence of an organization on which its own knowledge is a basis for growth.

1. Knowledge Registering Indicators
2. Knowledge Dissemination Indicators
3. Knowledge Sharing Indicators
4. Knowledge Creation Indicators
5. Financial Return Indicators

All these indicators are calculated and represent easily measurable values reached through formulas. Moreover, the calculation period of these indicators is done on a monthly basis, what allows adaptations to be done regarding the actions related to the knowledge registering, dissemination and sharing, which will be observed on the annual calculation. In addition, the reached results are compared to the ones reached on the previous year. The definitions and use of objective and measurable indicators, as well as the disclosure of reached results to all collaborators in the organization are essential and important issues for any initiative addressed to the knowledge management to accomplish its objective.

**Management Dissemination**

It is important to highlight another great challenge that impacts very much the development of any project and/or initiative related to the company knowledge management. Just like its concepts are based on knowledge sharing, its management should follow this same basic concept, that is, should be shared.

It is not acceptable to imagine that the knowledge management of an organization should be responsibility of a single functional area, as this means a great concept incoherence. Nowadays, there are several cases on which only one area of the company is in charge of it and it is normally related to human resources and information technology.

It is well known the importance of the areas addressed to the human resources management, as well as the ones that develop and implement the information technology systems, however, the knowledge management is a multidisciplinary task, what demands the participation of different areas of the company with distinct competences and several kind of knowledge to be applied.

Only the professionals who work on the area on which certain knowledge is applied have the competences to identify what should be registered, what may be shared and how it should be
disseminated. Therefore, there is no rule to be followed, each case is a case and it demands, necessarily the judgment of professionals with expertise in their working areas.

Knowledge management does not demands leadership of a single professional or of an exclusive area, but it demands the commitment of all collaborators, from the ones who work on a more operational sector to the leaders that also may help if they "wear the knowledge shirt".

Conclusions

An information technology system may contribute a lot to the knowledge management of an organization, as it enables the existence of a portal where the knowledge may be registered and consulted by the collaborators (Terra and Gordon, 2002). However, its mere existence is not a guarantee of success of such management as it is also necessary the implementation of initiatives and mechanisms of incentive that stimulate the collaborators to register and share their knowledge to the remainder employees. Only by this it will be possible to create an environment on which knowledge is the fundamental basis to meet the strategic plans of a company.

It is also very relevant the definition of indicators that allow the presentation of the reached results as a consequence of the implementation of the initiatives and mechanisms of incentive (Garratt, 2000). Such indexes should be objective and easy to measure, what makes the process more trustful and committed to the improvements that may be reached, besides resulting in a higher participation by the collaborators.

There are still new challenges to be reached; out of them the one that could be highlighted so far is the dissemination of the understanding that the knowledge management cannot be centralized at a single area of the organization. Just like it happens to knowledge, its management should be shared by all areas, based on their competences and attributions (Gamble and Blackwell, 2001).

The clear definition and adoption of such concept may be the guarantee of the perpetuation of all initiatives developed so far, as well as the leverage for the emerging process of several others.
Case 4

Why Knowledge Management Fails: Lessons from a Case Study

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EXECUTIVE SUMMARY

Knowledge is increasingly recognized as providing a foundation for creating core competencies and competitive advantages for organizations, thus effective knowledge management (KM) has become crucial and significant. Despite evolving perspectives and rigorous endeavors to embrace KM intentions in business agendas, it is found that organizations cannot capitalize on the expected benefits and leverage their performances. This is a case study of an organization in Hong Kong. It is a typical organization with a strong awareness and expectation of KM; yet its program failed within two years. Our findings show that KM activities carried out in the organization were fragmented and not supported by its members. Based on this failure case, four lessons learned are identified for use by management in future KM initiatives.

BACKGROUND

Founded in 1983, HS (the actual name of the company is disguised for confidentiality) is a Hong Kong-based enterprise with a production plant in mainland China. HS is primarily engaged in the production and export of handbags and leather premium products to the United States and European markets. The current CEO is the second generation of the founder. Like many companies in Hong Kong, HS centralizes all its strategic planning and decisions, as well as sales and marketing functions at its head office in Hong Kong while doing the production and assembly work across the border for low production cost. Appendix 1 is the organizational chart of HS. It is found that the head office has 10 staff including a CEO, a general manager, a sales manager, an operation manager, and six other administrative staff. The production plant in China has 450 staff including 40 managerial, supervisory, or administrative staff and 410 skilled workers. Over the years, HS has expanded its range of products and production capacities and resources in order to seize market opportunities and has enjoyed quite healthy growth in terms of sales turnover and profits.

SETTING THE STAGE

Business began declining with double-digit revenue losses in 1998. This was primarily attributed to the fierce competition in the markets and soaring production cost. For example, some competitors were offering drastic price cuts in order to obtain business contracts. Also, new product designs did not last long before being imitated by the competition. The CEO and the senior management team began planning the future of the company and to look for ways to improve the efficiency and productivity of its employees. Business continued to deteriorate, so that by 2001, in order to find out what had gone wrong, the CEO formed a strategic task force consisting of all managers in Hong Kong, several key managers responsible for the production plant in China, and himself to look into the matter. After two weeks of exploration (including observation and

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communicating with other staff in the company), the strategic task force concluded that knowledge within the organization was ineffectively managed; specifically, there was low knowledge diffusion from experienced staff to new staff, and high knowledge loss due to turnover. Driven by traditional management philosophy, the CEO and the strategic task force believed that they understood the organizational context better, and thus decided to undertake an in-depth investigation through internal effort instead of hiring an external consultant.

CASE DESCRIPTION

In June 2001, the strategic task force carried out investigation, observation, and interviews of employees in various departments. After three months, they identified the knowledge management (KM) issues summarized in Table 1.

<table>
<thead>
<tr>
<th>Issues</th>
<th>Problems from a KM perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>◆ Supervisors complained about the heavy workload</td>
<td>◆ Knowledge was not shared but solely kept by a small group of people.</td>
</tr>
<tr>
<td>◆ They were merely the experts/advisers for their team members.</td>
<td>◆ Learning initiatives among employees were low due to the silo effect of organizational structure.</td>
</tr>
<tr>
<td>◆ Supervisors had little interest in what other supervisors were doing and practicing as they considered their tasks were the most important agenda.</td>
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<tr>
<td>◆ Employees demonstrated passivity and taken-for-granted passion while they were learning new skills, for example, they implemented instructions without asking.</td>
<td></td>
</tr>
<tr>
<td>◆ When skilled workers left HS, specific production techniques were swiftly acquired by other competitors who employed those ex-staff of HS.</td>
<td>◆ Knowledge was lost to competitors.</td>
</tr>
<tr>
<td>◆ Supervisors did not have unified standard to extract best practices from experiences.</td>
<td>◆ Knowledge was not appropriately defined, captured, and retained.</td>
</tr>
<tr>
<td>◆ Employees encountered difficulties in identifying success stories or effective production techniques for respective clients.</td>
<td></td>
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<tr>
<td>◆ Employees did not have strong willingness to learn new techniques and practices.</td>
<td>◆ Knowledge creation and development was not encouraged, motivated, and nurtured systematically.</td>
</tr>
<tr>
<td>◆ Employees took a long time to acquire techniques yet hardly retained the acquired techniques.</td>
<td></td>
</tr>
</tbody>
</table>

From these findings, the strategic task force determined that open communication and discussion was necessary and effective to further examine the KM problems, and therefore called for a couple of meetings with managers and supervisors. In order to encourage open discussion, the meeting was conducted in an informal manner instead of the frequently used formal discussion (such as predefined order for reporting departmental issues). Furthermore, the room setting was changed with seats arranged in a circle to allow everyone to see each other and a flip chart was made available to jot down immediate thoughts. More importantly, everyone was encouraged to express his/her thoughts, opinions, and feedback from a personal perspective or collective stance (e.g., comments from subordinates).
The results of the meeting were encouraging as many participants expressed their opinions and comments eagerly. In particular, staff in the meeting agreed that KM was neither an extension of information management nor solely a technology application to capture, organize, and retrieve information or to evoke databases and data mining (Earl & Scott, 1999; Thomas, Kellogg, & Erickson, 2001). Instead, knowledge was embedded in people (e.g., skills and actions), tasks (e.g., production process), and the associated social context (e.g., organizational culture) that involved communication and learning among loosely structured networks and communities of people. Therefore, individuals/employees were crucial to the implementation of KM initiatives by utilizing their knowledge and skills to learn, share, combine, and internalize with other sources of knowledge to generate new thoughts or new perspectives.

With the above results, HS decided to devise and launch a KM program with an aim to institutionalize knowledge diffusion among employees and leverage knowledge creation for quality products. Instead of a top-down approach of policy making, the management adopted a middle-up-down approach (Nonaka, 1994) with supervisors as the major force to leverage and promote KM throughout the organization. To enhance acceptance and lessen resistance to change, HS chose a new product series to try out the KM initiative with a focus on the following four main aspects: strategic, organizational, instrumental, and output.

In the strategic aspect, it was considered that knowledge available and possessed at HS would fall short of the core competence necessary for business success (e.g., chic product design). Therefore, effort was needed to fill this gap by acquiring knowledge from both external and internal sources. From the organizational side, it was thought that knowledge was more valuable when it was shared and exchanged. Thus, a knowledge-friendly culture needed to be promoted through encouraging employees to socialize and share their ideas and thoughts such that new knowledge could be created to broaden their knowledge repositories. At the base level, it was determined that knowledge had to be acquired, stored, and disseminated in a systematic way to enable employees to access and reuse it easily. In doing so, essential knowledge, such as experienced practices in production skills and innovative ideas in product design, could be captured and recorded. Individual employees or teams who contributed knowledge useful and relevant to HS were to be rewarded. Last but not least, from an output perspective, it was realized that periodic reviews were crucial for evaluating KM effectiveness and for devising subsequent corrective action, if necessary. Performance indicators such as production efficiency, adoption rate of good practices identified, and clients’ satisfaction were required.

A detailed implementation plan was devised based on the above analysis, which was then agreed to and approved by the top management of HS. The KM program was officially launched in April 2002.

CURRENT CHALLENGES/PROBLEMS FACED BY HS

After 15 months, HS found that the KM initiative did not generate the positive impact on organizational performance as expected. Organizational performance remained stagnant, revenue continued to decrease, and staff turnover rate stayed high. Our involvement with HS as an external consultant began after the CEO had determined to find out why and/or what happened. Our assistance to HS was clear—to investigate the situation, to uncover the mistakes, and to look for remedies. A series of semistructured interviews with key employees in the managerial, supervisory, and operational levels were therefore conducted. Table 2 summarizes our findings.
Appendix 2: Knowledge Management in Government Cases

Table 2. KM results from 2001 to 2003 in HS

<table>
<thead>
<tr>
<th>KM Focus</th>
<th>Initiatives in 2001</th>
<th>Results in 2003</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✦ To determine knowledge gap</td>
<td>Identified core knowledge that led to business success</td>
<td>Unrealistic aims → created fallacies &quot;all the best in HS&quot; to direct KM development&lt;br&gt;Volatile support → undermined the KM climate</td>
</tr>
<tr>
<td><strong>Organizational</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✦ To establish knowledge-friendly culture</td>
<td>Shared knowledge in various socialization and informal gathering</td>
<td>Unframed socialization → created more confusion or negative perceptions&lt;br&gt;Ineffective human resources policy to retain knowledge workers → swifted loss of knowledge</td>
</tr>
<tr>
<td><strong>Instrumental</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✦ To acquire and stimulate knowledge creation</td>
<td>Acquired knowledge in departmental handbook and rewarded knowledge sharing behaviors</td>
<td>Unlimited definitions or views of sources of knowledge → left individual knowledge untapped&lt;br&gt;Emphasized monetary rewards to stimulate contributions → created self-defeating mechanism and unfriendly team culture&lt;br&gt;Perceived IT as cutting-edge solution → led to unduly investment on technology</td>
</tr>
<tr>
<td><strong>Output</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>✦ To evaluate and audit KM development</td>
<td>Conducted periodic review and measured organizational performance</td>
<td>Reviewed infrequently → created pitfalls to learn from mistakes, then moved ahead&lt;br&gt;Prejudiced on efficiency and profitability → overwhelmed short-term benefits to exploit existing knowledge</td>
</tr>
</tbody>
</table>

As seen, a good start does not guarantee continuity and success (De Vreede, Davison, & Briggs, 2003). First, two crucial reasons were identified as to why HS was unable to bridge the knowledge gap. They were (1) the top management was too ambitious or unrealistic to grasp and incorporate the "best" knowledge in industry into the company and (2) their insufficient role support in encouraging the desired behavior. Similar to many other KM misconceptions, top management wrongly aimed at incorporating other enterprises' best practices (e.g., product design of the fad) or success stories (e.g., cost cutting and streamlining operational processes) into its repositories without considering the relevance, suitability, and congruence to its capabilities. Therefore, this "chasing-for-the-best" strategy soon became problematic and departed from its KM goals. HS did not gain business advantages, such as unique product design and value-added services to customers, and were still unable to respond to the marketplace swiftly.

Second, the mere presence of KM vision is not sufficient to guarantee KM success. Most employees commented that top management involvement in the KM implementation was volatile and appeared to be a one-shot exercise (Gold, Malhotra, & Segars, 2001). For example, the KM program started well with noticeable initiative to identify untapped knowledge from various sources, yet fell behind the expected goals as top management involvement was remote (e.g., leaving the KM effectiveness as departmental responsibility) and support was minimal (e.g., time resources available for knowledge sharing and creation). Thus, the two factors directly hampered the employees' dedication and belief in KM as a significant organizational move.

Third, from the organizational aspect, even though various social activities such as tea parties were used to foster a friendly and open organizational culture, we found that most of these knowledge-sharing activities were futile because no specific and/or appropriate guidelines for such sharing had been devised (Nattermann, 2000). As a result, instead of having discussions that were directly related to tasks, or least contributed to idea generation, frequent chats (e.g., gossiping)
among employees and wandering around were found. Many employees were confused with what the sharing was all about. Some employees even perceived KM negatively as interfering with activities important to their daily tasks, creating resistance to participation in what was perceived to be a temporary fad.

Fourth, the instruments used to help acquire and stimulate knowledge creation and sharing encountered problems during implementation. The fallacy of knowledge acquisition with reliance on external sources (such as the existing practices addressed by competitors) undermined employees' intent to explore the available but untapped knowledge resident in their minds (Bhatt, 2001; Nonaka, 1994). The use of information technology to drive knowledge storage and sharing, in principal, was conducive to employees. Yet, the silo organizational structure of HS with disentangled databases for knowledge capture caused more harm than good. Some employees asserted that they did not have the incentive to access or utilize the departmental knowledge handbook and procedural guidance (available from databases) as it is a time-consuming endeavor to dig from the pile of information. Some employees found knowledge incomprehensible as it was presented and stored in various formats, with jargons and symbols that were neither standardized nor systematized across departments.

Fifth, although a reward system was established for knowledge creation and/or sharing, the emphasis on extrinsic terms, such as a monetary bonus, turned out to have an opposite and negative effect on cultivating the knowledge-sharing culture and trust among employees. Some employees commented that knowledge should be kept as personal interest (i.e., not to be shared) until they felt that they could get the monetary reward when shared or recognized by management. Other employees found that harmony and cohesiveness within the team or among colleagues were destabilized as everyone maximized individual benefits at the expense of teamwork and cooperation.

Sixth, there was a misleading notion that IT could be "the" cutting-edge solution to inspire KM in organization. Despite the introduction of IT tools to facilitate knowledge capture, codification, and distribution, it was found that IT adoption and acceptance remained low due to employee preference for face-to-face conversation and knowledge transfer instead of technology-based communication, and the general low computer literacy that intensified the fear of technology. In addition, given the insufficient support from management for IT training and practices, employees, particularly those who had been with HS for a long time, had strong resistance to new working practices for facilitating KM.

Seventh, it was noted that the KM initiatives were left unattended once implemented. It remained unclear as to how to exceed existing accomplishments or overcome pitfalls of the KM initiatives, as there was no precise assessment available. For instance, the last survey evaluating the adoption of best practices from departmental knowledge was conducted a year ago, without a follow-up program or review session. Another example was that the currency and efficacy of the knowledge recorded in the departmental handbook appeared obsolete as no procedures were formulated to revise or update the handbook.

Last but not least, an undue emphasis and concern with the "best-practice" knowledge at HS to improve short-term benefits (e.g., to exploit existing knowledge in order to achieve production efficiency) at the expense of long-term goals (e.g., to revisit and rethink existing knowledge and taken-for-granted practice in order to explore innovation and creativity opportunities). Some
employees pointed out that they were inclined to modify existing practices rather than create new approaches for doing the same or similar tasks as recognition and positive impacts can be promptly obtained.

EPILOGUE

To date, KM is considered an integral part of a business agenda. The dynamics of KM as human-oriented (Brazelton & Gorry, 2003; Hansen, Nohria, & Tierney, 1999) and socially constructed processes (Brown & Duguid, 2001) requires an appropriate deployment of people, processes, and organizational infrastructure. This failure case presents the challenges that could be encountered and coped with in order to accomplish effective KM implementation. The people factor is recognized as a key to the successful implementation of KM from initiation, trial, to full implementation. KM is a collective and cooperative effort that requires most, if not all, employees in the organization to participate. KM strategy and planning should be organized, relevant, and feasible within the organizational context. One’s best practices and winning thrusts may not be well fitted to others without evaluation for fit and relevance. A balanced hybrid of hard (e.g., information technology) and soft infrastructure (e.g., team harmony and organizational culture) is needed for success.

LESSONS LEARNED

Knowledge management is increasingly recognized but its challenges are not well understood. To institutionalize a KM program, organizations can draw lessons from this failure case so as to construe what imperatives are needed and what mistakes should be avoided. Management issues and concerns are highlighted as follows.

Lesson 1: Start with a KM Plan Based on Realistic Expectations

The mission and behavioral intentions of leaders have a strong impact on employees and where to aim and how to roll out KM processes (KPMG, 2000). In this case, it is appreciated that top management recognized its organizational ineffectiveness and initiated a KM plan as a remedy. We suggest, however, that planning based on unrealistic expectations undermined its ability to successfully direct future actions. Therefore, management has to be reasonable in setting KM goals, perceptions, and beliefs. It is suggested that a feasibility assessment of organizational infrastructures (e.g., financial resources, technology level) and organizational climate (e.g., employees’ readiness to KM, resistance to change) be conducted to define the KM principles and goals. Inspirational aims, which can be reasonably and feasibly accomplished, encourage employees to assess their personal knowledge and transfer others’ knowledge when it is shown to enhance existing practices and can help meet new challenges.

Lesson 2: Management Support is a Strong, Consistent, and more Importantly, Cohesive Power to Promote KM

It is evident that vision without management support is in vain and temporary. As valued most by the HS employees, continuous corroborations from top management is indispensable to motivate their commitment toward knowledge-centric behaviors for long-term competitiveness (Lee & Choi, 2003). Therefore, beyond visionary leadership, management should be willing to invest time, energy, and resources to promote KM. At its core, management could show their enthusiasm in a
Appendix 2: Knowledge Management in Government Cases

boundless and persistent way, including vocal support, speech, inaugural memo, and wandering around different business units to invite impulsive idea generation and knowledge creation from all levels of staff. Also, management could champion the KM process and lead by example with employees who are receptive to KM.

**Lesson 3: Integration of Monetary and Nonmonetary Incentives**

To stimulate KM behaviors, specifically sharing and creation, it is important to assure a balanced reward system integrating monetary and nonmonetary incentives that fit various forms of motivation (Desouza, 2003). In the beginning of the KM programs, employees needed to be shown that personal benefits could be obtained from KM success with improvement in products, processes, and competitiveness. Therefore, rewards that are direct, monetary-based, and explicit are useful. For this, management can provide salary increase or promotion. With the passage of time, rewards could be extended to something implicit. For instance, management can publicize those employees' names and respective ideas that contributed to organizational processes, or provide skills-enhancement program to enable employees to see their importance with extended job scopes. Moreover, management can consider rewards systems geared toward individual or team achievement so as to encourage more interaction, creativity, teamwork, and harmony among people.

**Lesson 4: KM has to be Cultivated and Nurtured, which is not a Push Strategy or Coercive Task**

As shown in this case, KM is not a singly motivated exercise. It requires a collective and cooperative effort to put into effect various resources. Other than the vision and top management support, operational staff can greatly affect the success of the KM program. Their influences affect attitudes, behaviors, and participation in KM and could exert positive impacts on KM effectiveness if managed properly. For attitudinal changes, efforts have to remove or at least alleviate employees' negative perception toward KM. For example, the fear and misconception that KM is a means to downsize organizations for efficiency or as heavy workload which requires much IT expertise. For behavioral changes, we highlight a supportive working environment where employees can have ample time to engage in KM endeavors, such as sharing and creation, a fair and positive culture where everyone is valued and encouraged to contribute to KM effectiveness, is needed. To encourage participation, pushing or mandatory activities are least effective. Coupled with the rewards systems, employees should be inspired to take risks as learning steps for KM success. Unexpected failure or unintended results may cause management to call for a break to identify the causes and remedy solutions. Do not quit or blame, otherwise, mutual trust and commitment to work with the KM processes will be lessened.
Appendix 2: Knowledge Management in Government Cases

APPENDIX 1:
ORGANIZATIONAL CHART OF HS
Case 5

ON TO ACTION: BUILDING A DIGITAL ECOSYSTEM FOR KNOWLEDGE DIFFUSION IN RURAL INDIA³

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Information and Communication technologies (ICY) have been used to deliver knowledge to support agriculture and rural livelihood (ARL) for over ten years now. Yet, in India today, use of ICT to support ARL remains at an early stage. Our survey in North Indian states shows that less than 10% of the Krishi Vigyan Kendras (Agricultural Science Centers) and other extension initiatives actively "use digital content" or "contribute digital content" for common use. Yet there are more than a hundred active ICT initiatives towards this end across the country. This paper investigates this intriguing gap. This research identifies the need for 'easier' knowledge flow mechanisms, information exchange, storage and retrieval mechanisms that can span language and literary barriers. This paper outlines an approach towards a self-managed knowledge organization in the ARL domain.

Introduction

Agricultural and food security policy makers clearly see the need for knowledge connectivity from the academic/research institutes to villages and then on to the world to close the loop so that the 'best' practices can enhance India's agricultural efficiency, create the "next" practices and create new avenues for rural livelihood. There is a national agenda for creating 'Knowledge centers' in every village. But the 'soft side' of this challenge needs more attention. There is no concerted effort to create a national agricultural knowledge repository in digital form which is alive and is nurtured daily through feeding, weeding, & pruning-or enriched by interactive usage. Lot of good knowledge nuggets remain at local level and as unstructured information or tacit knowledge. This paper reports the need for creating and implementing tools, architecture and replicable processes to enable cross flow of knowledge ("Information + insight" linked by concepts and contexts), in the form of "open content" for agriculture and rural livelihood. This paper chronicles the application of social networking and experiments to build a digital ecosystem for User-Co creation and self-management of digital contents to support agriculture & rural livelihood development activities in the hinterlands of Northern India. It highlights the need for developing an Ontology server and an Indian agricultural thesaurus in vernacular for semantic interoperability of digital content developed by different stakeholders in this domain. The paper then reports on field experiments and observations made through the 'Digital Mandi' project (www.digitalmandi.net) in the Kanpur-Lucknow region of Northern India and findings that show a pathway to Information

³ Suliman Hawamdeh, Editor, Proceedings of the 2005 International Conference on Knowledge Management, Knowledge Management: Nurturing Culture, Innovation, and Technology, World Scientific, 2005
design for knowledge diffusion in rural India. The paper describes the research using the SAP-LAP methodology.

**Situation (S)**

In quantitative terms Indian agriculture made significant progress over the last 50 years. One can see quantum jumps in total production of most agricultural commodities in reports published by the Indian Council of Agricultural Research or the Ministry of Agriculture. From chronic shortage and famine conditions of late 1950's, India has become a successful and significant exporter of many food grains and agricultural produce. An excellent food securing buffer stock has been built. But as India approaches the new WTO regime and the vision of border less and eventually frictionless trade in Agricultural produce, India is behind most developed nations, even behind its smaller neighbors in Asia, in terms of almost all the rural economy efficiency measure and yield measures. India is also a country with one of the longest distribution chain for most rural produce. For many typical agricultural produce while the farmer may receive less than ten cents per kilogram, the retail urban consumer may pay ten to fifteen times of that per kilogram. The reasons are many but many researchers (Singh, 2002, Bhatnagar & Schware, 2000, Kaushik & Singh, 2004) have pointed out information asymmetry, lack of rapid knowledge diffusion as prominent root causes. Researchers, policymakers and experts have frequently claimed that Information and Communication technologies represent one of the most powerful tools in the struggle against poverty. These tools can enhance the efficiency & effectiveness of Indian Agricultural practices & processes, by generating newer inspirations and avenues for grass root rural entrepreneurs and innovators.

There are various private and public efforts to expand "information and communication" access in rural India. It is expected that telephones, mobile phones, broad band internet, cable, community FM radio and many other forms of coverage will rapidly expand connectivity and access over the next 10 years. Technologies will continue to get cheaper, easier to use.

The cost and challenges of the ICT interconnection for rural India is huge and it is receiving significant attention. But this is not the only problem. Extension services and other content providers in this domain face high cost to develop and maintain digital resources. Often content is kept offline to protect print sales or may be accessible only at a fee.

The content that is online and free, is often not updated regularly, uncoordinated with other providers, so there is lot of duplication of general information and not enough 'specific' local information, making "pertinent content" harder to find.

Content that is live, interesting and 'in depth', interesting databases and decision- tools remain rare. This 'knowledge' side of the 'digital divide" must be addressed as vigorously as the "access" side. Bolstering this activity may even speed up access infrastructure as the farmers & rural folks will then enhance the ‘pull' effect to complement the current policy 'push'. While there are many variables that need to come together to enhance productivity in Indian rural livelihood & agricultural activities, which may not be entirely controllable, we can at least facilitate knowledge creation & knowledge exchange to help rural citizens deal successfully with unforeseen variables.
Actor (A)

The challenges before Indian Agriculture are immense. This sector needs to grow at a faster rate than in the past to allow for higher per capita income and consumption. It is an accepted fact that the sound agricultural development is essential for the overall economic progress. Two thirds of Indian workforce directly or indirectly depends on agriculture. This sector generates about 28 percent of its GDP and over 15 percent of exports. Rising consumer prosperity and the search by farmers for higher incomes will simultaneously drive crop diversification. Export opportunities for agricultural products are also expected to continue to grow, provided India could meet the stability, quality and presentation standards demanded by foreign trade and consumers and maintain its comparative advantage as a relatively low cost producer. (Source: Kisan Call Centre website)

Given its range of agro-ecological setting and producers, Indian Agriculture is faced with a great diversity of needs, opportunities and prospects. The well endowed irrigated areas which account for 37 percent of the country’s cultivated land currently contribute about 55 percent of agricultural production, whereas, rain fed agriculture which covers 63 percent of land accounts for only 45 percent of agricultural production. In these less favorable areas, yields are not only low but also highly unstable and technology transfer gaps are much wider as compared to those in irrigated areas. This is where knowledge can play a significant role to manage the critical challenge of rural poverty.

If India is to respond successfully to these challenges, greater attention will have to be paid to technology. Strengthened means of dissemination will be needed to transmit cutting edge know-how & information to farmers and rural artisans. Both technology generation and transfer will have to focus more strongly than ever before on the themes of optimization in the management of the available resources by producers, sustainability, coping with diversity by adapting technology more specifically to agro-ecological or social circumstances and raising the economic efficiency of agriculture. To make information transfer more effective, greater use will need to be made of modern information technology and communication among researchers, extension professionals and farmers. (Source: NATP website)

Public extension system requires a paradigm shift from top-down, blanket dissemination of technological packages, towards providing producers with the knowledge and understanding with which they solve their own location-specific problems. Continuous two-way interaction among the farmers and agricultural scientists is the most critical missing component of Agricultural Extension.

At present, the issues are being addressed by the Extension Systems of State Departments of Agriculture, State Agricultural Universities (SAUs), KV/Ks, NGOs, Private Extension Services through various extension approaches in transfer of technology with the able support of Indian Council of Agricultural Research and its many institutions as well as Technology institutes like Indian Institute of Technologies at Kanpur and Mumbai in collaboration with Medialab Asia. But limitations of the physical face to face Transfer of Technology (TOT) model continue to remain a challenge for the public and private extension systems as there are at least 400,000 medium and large villages spread over a subcontinent that need to be reached. With the availability of telephone and Internet, it is now possible to bridge this gap to quite a large extent but only if an appropriate mix of technologies can deliver ‘dynamic content’ in response to ‘user pull’. Unless the
content can help farmers to take risks in venturing out to crop diversification or adopt novel processes, the TOT can not make adequate impact on alleviating rural poverty.

There are many efforts today by a number of stakeholders (figure I) to address these issues in government, Institutional and private sectors. However most of these efforts depend on project funding from the government and the business models for ‘content’ generation and ‘digital repository’ efforts in vernacular languages are not self-sustaining. Yet, valuable contents are generated everyday in the Indian agricultural domain through the physical interaction between scientists at KVKs and rural citizens. However, in absence of a commonly agreed Ontology, metadata and other conceptual standards and in the absence of “easy to use” electronic interface and electronic exchange these physical contents remain tacit and do not contribute to a commonly accessible knowledge repository. Policy makers want to set up a virtuous cycle of learning - innovating - implementing- evaluating and learning again for agricultural and rural development. But in a large democratic country like India, the process involves many stakeholders and many actors. Figure 2 shows the information flow diagram for rural development activities. It is obvious that an ontology driven semantic interoperability through this maze can effectively network the different actors, while they pursue their micro objectives.
Appendix 2: Knowledge Management in Government Cases

Problem

Longitudinal discussions with extension workers, agricultural experts, researchers, NGO's and detailed analysis of 83 websites or portals which belong to Krishi Vigyan Kendras, Government departments, Agri Universities, Institutes and many web pages relating to Indian Agriculture hosted by global bodies (App. I), indicate the following requirements for a successful implementation of the knowledge system:

1. Development of digital content from the tacit knowledge bases of KVKs & other frontline entities should be possible through multiple media like landline phone, mobile phone, audio-video recording and digitization of paper documents.
2. Developing a common ontology, a semantic interoperability that facilitates knowledge storage, retrieval and exchange within the network among the various stakeholders so that a knowledge ecosystem can develop.

3. Open content and open source optimization so that the technology tools are affordable and remain available while evolving.

4. Developing "citizen interfaces" to the extensive knowledge base. These could be iconic, graphical, symbolic user interfaces (that relate to the ontology) for rural citizens' ease of access. This will include but not limited to application of touch screen, text to speech, screen reader, visualization & animation, interactive voice response system computer-telephony integration and application of wireless data services like MMS.

5. Digital content architecture and tools for easy telephone, mobile data and FM radio based interactivity and backend integration of such transactions into the knowledge base.

**Learning (L)**

There are a number of ways -some obvious and some not-so-obvious ones---in which ICT may serve the development process. For instance rural entrepreneurs can benefit because ICT help to improve access to markets or supply chains and provide a broader base for decision-making, thus making risk more calculable. Moreover, many local communities have experienced that ICT have increased bottom-up participation in the governance processes and may expand the reach and accessibility of government services and public infrastructure. In Andhra Pradesh or Karnataka Internet-based Citizen Service Centers allow for electronic bill payment, issuing of land record certificates, permits and licenses; or access to public information. The electronic village project of M.S. Swaminathan Research Foundation (MSSRF) in Pondicherry received the Stockholm award for its promise.

However, there is as yet little systematic empirical evidence of the supposed enormous 'developmental' impacts of ICT. Moreover, in many---especially rural---areas, the private sector is yet to invest significantly in ICT experiments (except for a few pioneers). This means that, if ICT access is to be expanded, public money will have to be spent -which in turn means that there are important trade-offs to be considered. In many areas, there are serious questions about how much money policymakers should spare for the build-up of ICT instead of investing further in potable water supply, roads, electricity or other physical infrastructure projects.

Given such trade-offs, there is a need to identify which kinds of ICT access and content deliver the best value for money, and how the limited resources that can be spent on it can be made to best suit the particular needs of rural India. A number of 'models' have so far been tried around the world.

One popular model of ICT provision in rural areas of developing countries, and one which attempts to combine phone access with access to the Internet. These are the so-called Telecentres or Information Kiosks or the recently introduced Infothela of Media Lab Asia- Kanpur-Lucknow Hub (www.iitk.ac.in/MLAsia). An Infothela is a common point of access for multiple users (often an entire community), providing a range of ICT services including Internet, fax, phone, e-
mail, word processing, and even specialized information retrieval or applications for agriculture & rural livelihood.

Telecenters have been established widely in the developing world, and vary in their service provision and means of funding. In Peru, the establishment of numerous 'Cabañas Públicas' created one of the highest concentrations of public Internet access and a significant reduction in prices. Nevertheless, the experience with Telecenters has so far been a mixed one. In numerous cases, usage, particularly of PCs, has been lower than expected or commercial viability was not attained. Of the over 70 Community Telecenters established since 1997 by the South African Universal Services Agency, only 40 per cent remain open today, with only 3 per cent making enough money to cover costs.

Buried at the end of the World Bank policy paper on the 'networking revolution: opportunities and challenges for developing countries' (June, 2000) is an account of multipurpose community Telecenters (MCTs) in rural Mexico. It turns out that of twenty-three MCTs built in rural Mexico; only five were working two years later. This is a failure rate of 80 percent.

The policy paper comments, "Problems encountered included insufficient maintenance funding, inadequate political interest and will, and cultural constraints which hamper community interest in the projects." The paper gives no hint why "political interest and will" might have been inadequate and why community interest might have been constrained by that hold all excuse for failure, "culture." The paper concludes that the Mexican case "underscores the importance of participatory design and attention to sustainability issues in the development of such programs." This problem was identified as a key research agenda for the Digital Mandi (www.digitalmandi.net) project, which stimulates this report.

Internet and Information Kiosks exist in various kinds, each with their respective merits. First, one might distinguish between the small private sector cyber cafes on the one hand and bigger, donor-funded Telecenters like e-Seva in Andhra Pradesh or e-Village in Pondicherry on the other hand. Smaller, privately run cyber cafes are often financially self-sustaining -but are thus usually restricted to areas where they expect to be viable (usually urban centers) and are usually neither within physical nor financial reach of the poor. They are also unlikely to be able to provide local content.---By contrast, larger, often externally funded Telecenters are rarely financially sustainable but can focus more on specific 'development' -aspects, including access. They can be specifically targeted at rural communities and can focus on training and knowledge diffusion.

A second distinction is according to the institutional context they are embedded in. This often has a significant influence on the 'developmental impact' of Telecenters. Commercial telecenters and commercial franchises are usually closest to commercial viability but, as mentioned, are unlikely to have an impact on the poor outside the economic circle. Telecenters run by or with the involvement of developmental NGOs are more likely to target poor and marginalized communities and focus on much-needed additional services like training, content creation, provision of public goods without which ICT access would be of limited developmental use. Telecenters in rural institutes, village schools or Krishi Vigyan Kendra’s for example as another alternative have the significant advantage that for their establishment an existing physical infrastructure only has to be extended and some of the ICT -relevant training can be cost-effectively integrated into the mainstream curriculum of these institutions. This partnership has successfully worked in the Digital Mandi project (www.digitalmandi.net).
Appendix 2: Knowledge Management in Government Cases

Action (A)

Thus there are a number of alternatives and apparently mutually exclusive business models for ICT implementation in Rural India.

On one hand it appears that kiosks run by local entrepreneurs with localized and targeted applications will succeed on the other hand following the success model of the world wide web itself one may suggest that if an infrastructure is created and user friendly appropriate interfaces are continuously accessible then local rural folks will develop their own applications and Information Kiosks or Infothela will survive.

But there are serious barriers that impede the later possibility. Barriers to information-access may be physical, economic, intellectual or technological; those impede rural users participation in the activities that add to the digital knowledge repository. The architects and system designers may actively impose the barriers or they may be allowed to continue simply through their lack of action or lack of understanding of the critical user conditions. Such critical user conditions may arise due to particular demographic, geographic, cultural, social, psychological, economic or other factors. Issues related to Information system usability such as ease of use, usefulness (Davis, 1989), decision effectiveness (Mason et al, 1973), user response, user satisfaction (Doll et al, 1988) and many other aspect of usability have been studied in great detail by researchers. But interactions with focus groups at various agricultural market places around Lucknow-Kanpur showed the need of a more detailed study on Information communication barriers on a more localized set of priorities.

A general framework for web design keeping in mind the human-computer interaction theories (Pirolli, 2001), web site usability principles (Huang, 2003), information intensity paradigm (Palmer and Griffith, 1998), e-customization models (Ansari and Mela, 2003) is already in place and is assumed to sufficiently address the question of defining broad guidelines for designing any successful website. It is therefore, assumed that a website with relatively high-level of accurate, up-to-date and pertinent content, deployed in a user-friendly way, customized to particular user groups, and tailored to specific geographical needs should be universally successful and hence, accepted in India too. However many such efforts have apparently failed to achieve their targets.

The challenges to agricultural and rural livelihood website usability for rural India arise mainly due to the highly specific local needs and the great diversity in local conditions. The major challenges are:

- Poor literacy rate—low use of textual information in daily life and high reliance on verbal communication for knowledge transfer.
- Remote village locations -physical distances compounding problems of dependence on middlemen and a nexus of exploitation through information asymmetry.
- Absence of content in vernacular languages (both a cause and an effect)
- Economic, low-cost solutions -any technology solution aimed at benefiting the masses in rural India must be affordable and low-cost so that the perceived economic benefits of such an endeavor are much more than the cost of switching over to a different technological solution.
A model that inspired the Mandi team was The Kothmale Community Radio in Sri Lanka. This project has combined community radio and Internet access. It has a leased line connection to the Internet and in the so-called process of ‘radio browsing’ Programme presenters browse the Web in the studio on behalf of listeners (who provide requests/input through phone or post). Relevant ‘experts’ from the community then interpret the information for listeners. Another good example of the creation of relevant local content is the ‘Infoshops’ in Pondicherry, India. After information requirements are identified during a trial period, volunteers from the village create a local database comprising government programs for low income rural families; cost and availability of farming inputs such as seeds and fertilizers, grain prices in different local markets; a directory of insurance plans for crops and families; pest managements plans for rice and sugar cane; a directory of local hospitals, medical practitioners and their specialties; a regional timetable for buses and trains; a directory of local veterinarians, cattle and animal husbandry programs. All these preceding experiments contributed to the Digital Mandi design. But the project soon revealed that without a self managed, evolving, ecosystem like knowledge repository, where users can co-create content and the content can be so “tagged” that it can be recalled and reused in multiple context, the editorial over head remains high & expensive.

Performance (P)

The finding from the initial research at Digital Mandi has shown that the presence of a number of desired features in any ICT system design for rural India that leads to higher user satisfaction. Such features are broadly aimed at satisfying one or the other of the following immediate user objectives:

a) Ease of access.  
b) Up-to-date content.  
c) Layout, design, consistent themes.  
d) Easy navigation.  
e) Higher interactivity.  
f) Access through multiple media (particularly voice).  
g) Higher use of non-textual information.  
h) Language options.  
i) Lower cost of transaction.

Figures A and B in the Appendix show the resultant implementation techniques reported earlier (Chatterjee, 2003).

The Digital Mandi project thus revealed that ICT tools and technologies could make knowledge and field experiences (in the form of digital content) widely available. Ethnographic observation guided design principles, which improved access and acceptance by rural citizens. But the maintenance, dynamic update and enhancement of the digital content needed regular editorial intervention and the process of finding and assembling information remained largely a manual task.

Several brain storming sessions of the stakeholders in the Digital Mandi project generated a conceptual architecture of the desired knowledge-net.
Appendix 2: Knowledge Management in Government Cases

This is shown in figure 3. It was clear that to acquire the characteristics of a self-managed ecosystem, in this knowledge-net, the digital contents created in various forms by the stakeholders needed ‘interoperability’. Interoperability provides potential for automation and systemic self-management. Initial experiments across the digital repositories of the stakeholders in the project showed that syntactic interoperability can be achieved for transfer, exchange, mediation and integration of content by adopting compatible forms of encoding and access protocols and design guidelines. Identification and naming schemas are important at this stage for pulling together related information. But while that operability may be enforceable in a corporate extra-net, in the domain of ARL it poses many problems due to the diversity of stakeholders and multiplicity of hardware/software and other socio-technical diversities existing in the network.

The goal framework in the next phase of the project thus focuses on semantic i.e. interoperability. The goal here is to facilitate context sensitive query processing over heterogeneous information sources.

The current phase of this research project therefore focuses on developing an Ontology server (OS) in the Indian ARL domain (IARL). The agenda here is to build an action oriented vehicle to provide consistent usable access to information for the rural Community searching for knowledge, as well as to assist those whose interaction (e.g. KVK scientists and farmers) create new knowledge. Firstly, the project now attempts to build the OS for IARL as a reference tool that can structure and standardize agricultural terminology in multiple Indian languages for use by different systems. This ontology will contain terms, the definition of those terms and the specification of relationships among those terms. It will start with a Thesaurus, the conversion of the Agrovoc hosted by the Food and Agriculture Organization of the United Nations in Hindi & later in other Indian language. But the aim is to work in parallel on enhancements to the Thesaurus, so that the system can provide the basic relationships inherent in the thesaurus. It will aim to capture and structure the knowledge in the ARL domain. Figure 4 depicts select dimensions of the technology framework for this ontology driven approach to rapid deployment of laboratory knowledge for field level actions.
Figure 3 and 4 together represent several parallel sets of activities that are being pursued within a project framework that has been called DEAL - Digital Ecosystem for agriculture and rural livelihood support. Key clusters of these activities are:
Appendix 2: Knowledge Management in Government Cases

I. Developing a Thesaurus in Hindi based on United Nation FAO's Agrovoc as a first step. Thesaurus in all other major Indian Languages will follow. This entails consensus building among different regional subcultures and agricultural practices.

II. Development of taxonomies, data models and ontology for collating, searching and aggregation of agricultural content.

III. A range of easy to use interfaces for acquiring the knowledge exchange between the extension workers and the farmers from the field through voice mail, email, web log, sms, mms, photographs, video recording and even paper documents. New collaborative authoring, co-creation tools are being developed that facilitate non-textual aggregation.

IV. Intuitive UI, novel metaphors for contributing, accessing, searching and composition of knowledge objects from the field, development of metrics to monitor usage and impact.

V. Content inputs and content delivery happen over multiple platforms, the key challenge is to manage the back end integrity, easy access but high security.

Conclusion

Rapid knowledge diffusion is a critical need for building up the global competitiveness of Indian agriculture. Low level of textual information usage and multiplicity of languages in the learning network of knowledge creators and knowledge users demand novel interfaces for knowledge capture & exchange. But the research project running for nearly 3 years now has a core focus on the knowledge organization system in the form of an ontology driven service because that is the only way to make the vast task of creating a digital knowledge repository, to a large extent, self-managed. The Indian agricultural ontology server will thus be at the core of the nascent digital ecosystem. However there are significant other research outcomes regarding information design both in terms of architecture and content presentation for this federated knowledge service.
Appendix 2: Knowledge Management in Government Cases

### Appendix

| ICAR INSTITUTES | ICAR, IARI, CICR, CAZRI, CIRG, NBAQRI, NBQRI, CAF, IASRI, NCAEPRI, IVRI, IIPR, NBR, NIRJIRPT, VPKAS, NDIR, IIHR, NIANP, NRCOG, NCIIPM, PDBC, IISR (SPIICES), IISR (SUGARCANE), ISSS, NRCM, NRCMAP, AICRPUR |
| STATE AGRICULTURAL UNIVERSITIES | MPKV, RAHURI, PDKV, AKOLA, PAU, LUDHIANA, HAU, HISAR, KAU, THRISSUR, TNAU, COIMBATORE, GAU, NAVEARI, AAU, JORHAT, TANUVAS, CHENNAI, UAS, DHARWAD, UAS, BANGALORE, ANGRAU, HYDERABAD, UHF, SOLAN, HPKV, PALAMPUR |
| MINISTRY OF AGRI | NIAM, MANAGE, DARE, AGMARKNET, NHB, FPI |

**Table I: Major Organisations with Websites on Indian Agriculture**

![Diagram](image)

**Figure A. Flexibility Continuum Of ICT Diffusion Models**
Case 6

Reserve Bank of New Zealand: Journey Toward Knowledge Management

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David J. Pauleen, Victoria University of Wellington, New Zealand
Sally Dexter, Victoria University of Wellington, New Zealand

EXECUTIVE SUMMARY

This chapter outlines the adoption and implementation of knowledge management within the New Zealand Reserve Bank. In 1999, the Bank recognised that it had a very high exposure to loss of knowledge on departure of key staff. This was mainly due to two factors: recruitment of staff from a limited global pool of specifically skilled labour, and an average length of service of more than nine years during which time staff members accumulated an extensive knowledge of the Bank and its operations. In response to this and other challenges, the Bank embarked on an ongoing knowledge management program. The Bank invested significant resources into the program and from an initial corporate vision developed a knowledge management framework that led to the identification of potential areas of improvement within the organisation. The resulting knowledge strategy encompassed several key initiatives, the most significant of which was the goal of changing the organisational culture. Other initiatives included the consolidation of the Bank’s contact management into a single system, a review of the existing document management system, and information mapping. To date, while some initiatives have been achieved, others remain to be done. The challenge for the Bank now is to move from structured to unstructured processes for knowledge management and maintain the knowledge management focus while balancing available resources. The Bank must also consider how best to progress initiatives without necessarily attaching a specific knowledge management label, and identify ways to move ongoing development of knowledge management strategies to the next level.

BACKGROUND

The Reserve Bank is the central bank of New Zealand and a unique entity. Due to its exclusive status, it is not therefore afforded the recruitment opportunities available to organisations in more prolific industries. In addition, the average lifetime of staff members is more than nine years, resulting in a significant potential loss of knowledge on departure. Consequently, the Bank has identified knowledge loss as a high risk within the organisation. In response to this risk, an extensive knowledge management program has been initiated that now spans a five-year period.

This paper presents a background to the case study organisation, and details the steps taken to implement knowledge management through the organisation.

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Organization Background

The Reserve Bank of New Zealand (RBNZ) is wholly owned by the New Zealand Government and serves as the nation's central bank. The Bank has the mission of building national and international confidence in the stability and integrity of New Zealand's currency and the country's monetary system. The Bank has three main functions:

- Operating monetary policy to maintain price stability;
- Promoting the maintenance of a sound and efficient financial system; and
- Meeting the currency needs of the public.

More specifically, the Bank is charged with:

- the registration and prudential supervision of banks, and the promotion of a sound and efficient financial system;
- the provision of interbank settlement facilities and related payment services to New Zealand banks;
- advising the New Zealand Government on the operation of the financial system;
- the provision of cash and debt management services to the Government as well as secretariat services to the Overseas Investment Commission; and
- the issue of New Zealand currency and management of foreign exchange re-serves.

The Bank's core functions also include the management of NZ $4+ billion of foreign reserves and the management of relationships with international bodies such as the World Bank and the International Monetary Fund (IMF) in order to ensure that the interests of New Zealand are promoted.

Management Structure

The governor leads the Reserve Bank. The minister of finance, on the recommendation of the board, appoints the governor for a five-year term. In accordance with the RBNZ legislative framework (RBNZ Act of 1989), the governor is the single decision maker for the organization and accountable for all activities of the bank.

The minister of finance is responsible for appointing the board of directors. It is the task of the board to regularly review both the performance of the governor and the bank, and provide feedback to the minister of finance. The board must comprise not less than seven, but not more than 10 non-executive members, and does not have any decision-making authority, although they do make recommendations to the minister regarding the appointment of the Reserve Bank governor.
The governor is provided advice from a number of internal committees, including the following:

- the Governor’s Committee;
- the Monetary Policy Committee;
- the Official Cash Rate Advisory Group;
- the Financial System Oversight Committee;
- the Risk Management Committee;
- the Reserves Oversight Committee; and
- the Communications Committee.

The Bank is structured into nine departments including the Knowledge Services Group. The senior management team consists of the governor, a deputy governor, and the heads of the various departments as detailed in Figure 1.

*Figure 1. Reserve Bank management structure (adapted from Reserve Bank, 2002)*
Financial Status

The Reserve Bank income is mainly derived from investing the proceeds that the Reserve Bank receives from issuing currency. The Bank spends some of the money to pay its operating costs, the extent of which are fixed in a five-year funding agreement with the Government. The remaining earnings are passed directly to the Government. The balance sheet of the Reserve Bank is shown in Table I. Further financial information is included in Appendix 1.

Organizational Climate

The Reserve Bank employs approximately 220 staff, a figure which has been much reduced from the mid 1980s, mainly as a result of a "rightsizing" program.

The Bank works to ensure that it has the right people, systems, and structures in place. In keeping with this policy, in 2002, the Bank carried out a review of its human resource and corporate policies with the aim of ensuring flexibility in responding to changing priorities. The Bank has a commitment to a process of staff consultation and involvement when making changes and believes that the presence of a very flat organizational structure provides greater integration, flexibility, and cooperation across departments.

More recently, the results of a staff survey focused the Bank on the need to develop leadership and communication programs for its staff. The purpose of the survey was to identify areas that would improve the overall organisational environment to make the Bank a more effective and better place of work. The results identified several opportunities for the Bank including the following:

- Changes to the management practices;
- Improvement in communication within the Bank;
- Better tools and information; and
- Recognition for work done.

The Bank is an advanced and proactive user of technology, comprising predominantly technology-literate, highly skilled specialist staff. Due to the nature of policy development, there is a requirement for collaboration across business units and this has been primarily facilitated through either face-to-face meetings or through the use of e-mail. The Bank was an early adopter of a document management solution as a way of encouraging collaboration and the sharing of unstructured information across business units.

At an early stage, management identified issues related to collaboration and investment in both human and technology capital. However, business case justification of any major investments in technology has been challenging, given the size of the organization, particularly in the last five years. This has been countered by a management philosophy that accepts that some initiatives are strategic and, as such, may not always stand to business case justification in the traditional sense. The management also had the foresight to recognise the risks related to management of intellectual capital and embarked on initiatives to mitigate these risks.
Appendix 2: Knowledge Management in Government Cases

Table 1. The Reserve Bank’s balance sheet (adapted from Reserve Bank, 2002)

<table>
<thead>
<tr>
<th>Assets</th>
<th>2002/2003</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Reserves</td>
<td>$5.1 billion</td>
<td>Debt to fund the purchase of foreign reserves</td>
</tr>
<tr>
<td>Assets arising from managing the Crown’s cash operations</td>
<td>$3.4 billion</td>
<td>Obligation to repay the Crown’s and others’ deposits with the Reserve Bank</td>
</tr>
<tr>
<td>Government bonds purchased with monies received from issuing currency</td>
<td>$2.8 billion</td>
<td>Obligation to replace bank notes and coins already in circulation</td>
</tr>
<tr>
<td>Assets, including the Reserve Bank building in Wellington, and so forth, and government stock, bought with equity</td>
<td>$0.4 billion</td>
<td>The Government’s net investment in the Reserve Bank</td>
</tr>
<tr>
<td>Total</td>
<td>$11.7 billion</td>
<td></td>
</tr>
</tbody>
</table>

SETTING THE STAGE

In the early 1990s, the Bank employed approximately 800 staff, many of whom had been with the organization for a considerable period of time. In one instance, a staff member had been with the Bank for over 40 years. In another, a governor of the Bank recently left after 33 years of service. The length of service, combined with the specialist skill set required by Bank staff, resulted in a high percentage of knowledge workers. Consequently, there was a significant risk of potential loss of knowledge as a result of a staff member leaving.

Towards the end of the 1990s, with the rapid advances in technology and the accompanying shift to a global community, the Bank began to experience a slight rise in the level of staff departures. Initially, staff were leaving from predominantly operational areas where the loss of knowledge was not as critical. In these areas, much knowledge had been captured through documented processes and procedures. However, when staff concerned with policy started leaving, it became critical to consider how to deal with this potential loss of knowledge.

As a policy-making organization, the Bank had always been reasonably good at sharing information. When any development was taking place, it was normal practice for information to be readily exchanged with problems arising only where previous actions had been forgotten about, or staff members had left the organisation and, as a result, the information was not readily accessible. However, despite this seemingly strong knowledge-sharing practice, there was still a culture of structural silos within the organisation, with little boundary crossing between departments. This was emphasized in the policy areas where staff members were closeted in offices and were rarely seen to leave other than at lunchtime or at the end of the day.

Concurrent to the increasing level of staff turnover and problems arising from structural silos, the Bank was going through an organisational "rightsizing" program. There was also growing interest in knowledge management within the wider environment at a national level from the government and public sector as well as within commercial and academic circles.

Knowledge management, as it is currently understood, has been around for more than a decade. The term has, however, spawned a proliferation of definitions. Snowden defines it succinctly (1999) as:
The identification, optimisation, and active management of intellectual assets, either in the form of explicit knowledge held in artefacts or as tacit knowledge possessed by individuals or communities (p. 63).

The predominant focus of organisations embracing knowledge management has been the potential for higher levels of profitability, greater market share, and increased innovation. However, there are wider potential benefits for organisations that successfully manage their knowledge, including a flexible approach to change and better workplace morale (Scherer, 2001). In the public sector, Wiig (2002) contends that knowledge management can enhance decision making, assist public participation in decision making; build competitive societal intellectual capital capabilities, and assist in the development of a knowledge-intensive workforce. It can also bring much needed assistance in the area of knowledge sharing, which has historically been an area of difficulty for the public sector (OECD, 2003).

Much academic research pertaining to knowledge management has been predominantly published in the information science/information technology (IS/IT) literature (Newell et al., 2002) and has led to information systems and technology becoming synonymous with knowledge management. More recently, the field has undergone a change in focus from a predominantly technological approach to a more integrated approach (Gold, Malhotra, & Segars, 2001), which has encouraged organisations to bring a more holistic approach to their knowledge management efforts.

Implementation of knowledge management has proved a problem for many organisations. Despite recognition of the potential benefits that knowledge management may offer, many organisations simply did not know where to start (Earl, 2001). Knowledge management best practice has been well documented (Davenport, De Long, & Beers, 1998; Chourides, Longbottom, & Murphy, 2003; Mertins, Heisig, & Vorbeck, 2001) and is often an approach advocated by knowledge management consultants. The downside of best practice is that while it provides examples of implementation approaches that organisations may adopt, it does not take into account the individual factors of the organisation, including the external environment, the internal environment, technology, culture, and infrastructure. Knowledge management is not a "one size fits all" solution, but must be carefully tailored to meet the unique organisational characteristics. By contrast, Snowden's principles of "organic knowledge management" and interest in complex adaptive theory support the view that knowledge management solutions are unique to the organisational context in which they are created (Lelic, 2002).

As a quasi-government department, the Reserve Bank was able to leverage public sector interest in knowledge management in support of its knowledge management journey.

CASE DESCRIPTION

The nature of the work of the Reserve Bank was such that it required a range of specialist skill sets that were not readily available within New Zealand. This was mainly due to the fact that each country has only one central bank, and, therefore does not have a large pool of individuals with the specialist skill sets, such as macro-economics and banking supervision, that are required. Consequently, recruitment of staff was effectively limited to a global pool of specifically skilled labour drawn from central banks around the world.
In addition to the scarcity of skill sets, the average length of service at the Reserve Bank was more than nine years, as shown in Table 2.

| Table 2. Human resource statistics (adapted from Reserve Bank, 2002) |
|-----------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Total staff at June 30 (FTE) | 293             | 290             | 289             | 281             | 283             | 283             | 199             | 192             | 193             |
| Average years of service at June 30 | 8.6 | 8.6             | 8.7             | 8.3             | 8.8             | 9.4             | 9.4             | 9.2             | 9.2             |
| Annual staff turnover      | 9.6%            | 15.0%           | 10.6%           | 8.8%            | 10.0%           | 10.4%           | 14.9%           | 13.5%           | 11.3%           |

During this time, staff members accumulated an extensive knowledge of the Bank and its operations, resulting in a very high exposure to loss of knowledge on the departure of key staff. As a consequence of this exposure and of the "rightsizing" program that the Bank was then undergoing, the Bank recognised that it needed to take action to minimise the risk of knowledge loss. Although the NZRB was one of the first to recognise the significance of these issues, other central banks such as the Bank of Canada have also expanded their research programs to include the issues of talent and knowledge sharing (Bank of Canada, 2002).

In 1999, the Bank was not alone in recognising the growing importance of knowledge management. At the same time, the Information Technology Advisory Group (IT AG), comprising academics and representatives from the business community and public sector, presented a report to the New Zealand Government, titled "The Knowledge Economy." The report focussed on the need for New Zealand to change its economic mix and warned that if the nation failed to make the transition from a pastoral to a knowledge economy, then it was destined to become nothing more than a holiday destination for visitors from countries where the knowledge economy had been embraced (IT AG, 1999). As a result of this report, the New Zealand Government developed a vision of New Zealand as a world leader in e-government, with the Internet being the dominant means of access to government information, services, and processes. In addition, it was their intention that public sector innovation should support a wider knowledge based society. Hearn and Rooney (2002) posit that it is the role of governments to facilitate the technical, cultural, and social aspects of waves of innovation. This role is widely supported throughout the Organisation for Economic Cooperation and Development (OECD), where the majority of central government organisations regard knowledge management as a priority and have knowledge management strategies in place (OECD, 2003).

It was at this point, and with the combination of national and local drivers, that the Bank developed a corporate vision that focussed on knowledge management as a key component. The vision was led by the then deputy governor, whose involvement signified the high level of importance that the Bank attributed to knowledge management. This was an important first step and allowed the Bank's vision to permeate the organisation, providing staff with a needed sense of purpose that transcended everyday activities (Gold, Malhotra, & Segars, 2001). The Bank's new corporate vision prompted the required changes within the organisation (Kanter, Stein, & llick, 1992). In this case, the vision encapsulated the contribution that knowledge-based value creation can make (Earl, 2001).
The first step after development of the corporate vision was for the Bank to develop a business case to move forward in developing a knowledge management program. Development of a business case for knowledge management is difficult given the seemingly intangible benefits and difficulty in quantifying or measuring the potential outcomes of initiatives. Although the Government vision and the national drivers arising from this were a key source of support for the Reserve Bank vision, they did not assist in the development of a direct business case for the undertaking of a knowledge management program. However, the Bank’s status as a quasi-government department enabled it to leverage government interest in building the knowledge economy and positioning the public sector as the driver of the knowledge economy was of particular importance to the Bank. The Bank also emphasised its view that government departments should be showing leadership. By emphasising the importance of leadership from the public sector, the Bank was able to add significant weight to its own business case.

One of the most significant steps in the Bank’s journey to knowledge management was the establishment of the Knowledge Services Group. This group, comprising staff from across the organisation, was charged with identifying the importance of knowledge management for the Bank and, subsequent to this, implementation and maintenance of organisational knowledge management practices. The Bank appointed Yogesh Anand to the role of chief information officer (CIO). His role was to head the Knowledge Services Group and take overall responsibility for the Group’s combined areas of knowledge management, information management, and technology. A critical part of Anand’s role was to take the knowledge management vision and understand what it meant for the Bank, to refine it, to elaborate it, and finally to replace theory with action.

From the outset, involvement in the knowledge management initiative came from all levels. The Bank’s governor directly sponsored the initiative, and this top-level support was particularly helpful in communicating the importance of the initiative to all staff. A clear corporate vision (Kanter, Stein, & lick, 1992; Nonaka & Takeuchi, 1995) and top-level support (Blackler, 1995; Nonaka & Konno, 1998) are widely acknowledged as fundamental to the development of a strong knowledge culture. At the same time, staff from the library and records management area as well as other parts of the Bank came together to form an informal, grassroots network. This network followed the growth of thinking on knowledge management theory and could be categorised as an early community of practice, defined as one of three key critical components of knowledge management (Cohen & Prusak, 2001). Other critical components were identified as the trust of the organisation’s staff and the presence of appropriate social norms and organizational culture, both of which were confirmed by the experience of the Bank. Communities of practice have an important role to play in sharing learning and knowledge across an organisation (DiBella & Nevis, 1998), as evidenced within the Bank, where this informal network initiated brown-bag lunchtime sessions, where those interested in finding out more about knowledge management and how it would work in the Bank could meet and discuss the various issues. This group also helped to identify the barriers that existed in terms of knowledge sharing.

Building a KM Framework/Strategy

Thus far, the Bank had developed a vision and seen the formation of both the Knowledge Services Group and more informal knowledge management-friendly networks. However, although knowledge management was much discussed, very few organisations were actually implementing knowledge management programs. Despite recognition that knowledge management could be beneficial to an organisation, many organisations simply did not know where to start (Earl, 2001).
The Bank found itself in a similar position and determined that the most logical starting point was to gain an understanding of knowledge management, to investigate global best-practice thinking, and to identify a preferred development process or framework that would be most appropriate to the Bank. Development of knowledge management frameworks can assist organisations to understand the sorts of knowledge management initiatives that are possible and to identify those that are most suitable to the context of the organisation (Earl, 2001).

To enable this development, the Bank sought to develop its own local framework with the help of an outside individual who could bring in best practice and knowledge in terms of what was happening in other parts of the world. However, a critical concern for the Bank was loss of control of ownership of the process. In order to maximise potential of the appointment, the Bank secured the services of an individual through whom it could gain access to established networks and the individual's organisation. By doing this, the Bank was able to harness significant information on what other organisations were doing in relation to knowledge management, and assessment of this information would assist the Bank to develop its own knowledge management strategy. The aim of a strategic approach to knowledge management is "to build, nurture, and fully exploit knowledge assets through systems, processes, and people and convert them into value as knowledge-based products and services" (Earl, 2001, p. 228). This was the Bank's objective.

The Bank then undertook a 12-week program that effectively developed the framework into a workable strategy.

**Strategy Development**

Developing the Bank's knowledge management strategy involved all areas of the organisation, and contained four main phases as shown in Figure 2. As part of this work, examination was made of the organisational culture, structure, and infrastructure to determine what changes would be needed.

*Figure 2. Knowledge management strategy development process (adapted from Anand, 2003)*

In the initial three-week phase, the Knowledge Services Group worked with the external consultant to gather and review the knowledge management data and best practice from around the world.
The second phase focussed on internal data gathering during which a number of structured interviews and workshops were carried out throughout the organisation to investigate the knowledge required by each function and to understand what individuals saw as being the opportunities (see Appendix 3). Additional input was sought from the members of the informal brown-bag network who had been meeting prior to the onset of the strategy development. This group had valuable information regarding knowledge management thinking at the grass roots level and had helped to identify some of the existing barriers to knowledge sharing within the Bank.

One area of the strategy development that posed particular difficulty was the identification of specific knowledge that would have to be managed in each function. In order to overcome this difficulty, three separate categories were identified for classification purposes:

1. Structured data (S)
2. Unstructured and semi structured information (U)
3. Experience/knowledge (E)

The information gathered through the interviews and workshops was then structured into these three categories as denoted in Figure 3. For example, one workshop focussed on experience and information into the development of monetary policy. Feeding into the process was structured (data) and unstructured information (reports, etc.) along with experience from external and internal organizations. This was then used to identify where the exposures may be in terms of risks or barriers.

The three categories were also analysed in terms of their collection, storage, access, sharing, and use as shown in Figure 3.

*Figure 3. Categorisation of information (adapted from Anand, 2003)*

<table>
<thead>
<tr>
<th></th>
<th>Collect Capture</th>
<th>Organise Store</th>
<th>Access</th>
<th>Share</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured (data)</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td>Un/semi-structured</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td>(email, docs, reports)</td>
<td>![ ]</td>
<td></td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
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<tr>
<td>Experience (knowledge</td>
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</tr>
<tr>
<td>in people’s heads)</td>
<td>![ ]</td>
<td></td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
</tbody>
</table>

Note: Sharing within departments is much stronger than sharing between

This outcome of this process indicated that, as expected, the Bank was reasonably good at managing the structured information (data) in terms of sharing it and providing access to it. With unstructured or semistructured information, the Bank considered it was good at its collection, but not so good at organising and storing it. For example, although a document management system
was in place, it did not integrate well with the e-mail system and so e-mails tended to be held personally. The same thing was found with experience - while the Bank considered it was good at recruiting both graduates and globally experienced staff, its view of their experience then tended to become limited to their specific role rather than their entire experience, which was often far wider. The Bank also found that sharing of information within departments was far better than the sharing between departments.

Armed with this knowledge, the Bank then carried out phase three of the program, which included a gap analysis that would be used to formulate the strategy. The gap analysis identified four threads:

- **People to Information.** This category consisted of infrastructure-type activities aimed at improving knowledge repositories as well as making them easier to access. This ensured that individuals had timely, secure, and accurate data and information to be able to carry out their work: These infrastructure-type activities operated at two levels: management of information coming into the organization, and handling the dissemination of captured information. To carry out the activities required an understanding of what information was needed, or at least, anticipation of the broader requirements. To achieve this, staff in the Bank's information centre worked closely with the different departments to ensure that they knew all that was available within the organisation.

- **People to People.** This category was identified primarily as a culture issue and focused on sharing the experience and knowledge of staff and making it easily accessible through maintaining and developing contact networks. In this instance, an environment was required, for example, “coffee machine discussions,” which enabled and encouraged the exchange of ideas, and which ensured that staff were aware of who knew what within the organisation, as well as allowing new experiences to be shared.

- **Institutionalise Knowledge.** While the Bank was good at capturing decisions, it was not always as efficient in its responses to them. For example, the thinking that went into its decisions, the alternatives discussed, and market reactions were not always captured. Consequently, there was little learning captured for reuse. The challenge here was to turn individual knowledge into an institutional repository, so that it became part of the corporate memory.

- **Collaborative Culture.** The intent of this was to change the culture so that sharing became second nature within the organisation, and as a consequence, moved away from the view that "knowledge is power" to one of "knowledge sharing is power." From an organisational perspective, this meant ensuring that the organisation allowed sharing to happen, with executives leading by example to develop and actively reinforce the organizational culture (Schein, 1992).

An example of facilitating opportunities to share is the recognition of the importance of staff mixing in the cafeteria. When the existence of the cafeteria came under review, the Bank decided to keep it as its benefits in this regard had been recognised. Activities in this area were focused on creating a collaborative culture in order to make the most of the resources that the Bank had, and a collaborative working environment in which sharing is active and deliberate.
Appendix 2: Knowledge Management in Government Cases

The completion of the gap analysis allowed the Knowledge Services Group to identify a number of specific initiatives that would enhance knowledge management within the Bank. These initiatives were developed and categorised in terms of cost and importance as shown in Figure 4.

![Figure 4. Reserve Bank knowledge management strategies (adapted from Anand, 2003)](image)

In general, the initiatives were aimed at improving the accessibility to structured and unstructured data and to the knowledge held by people, improving the corporate memory, and developing the right culture. In particular, they focussed on infrastructure issues such as the tools required. These issues could be regarded as the low-hanging fruit since they were more easily understood by people and provided a catalyst for a change in culture. However, they also included more difficult cultural and leadership issues. In keeping with the complex nature of knowledge management, these initiatives presented a multifaceted approach that included cultural, technological, and organisational infrastructures as identified by Gold, Malhotra, and Segars (2001).

During the strategy development process the general feeling amongst many within the organisation, apart from the knowledge management enthusiasts, seemed to be one of nonchalance. In many respects, it was recognised that the concept of knowledge management was
not new, and there was an underlying feeling of a new label being placed on an old problem. The Knowledge Services Group countered this by talking not about knowledge management, but about the specific issues that were being identified and how these might be resolved. While the term "knowledge strategy" or "knowledge framework" was found to be useful in terms of discussions with the senior management team and in the development of individual business cases, at the grassroots level, people wanted issues to be resolved. In removing the "knowledge management" label, more credibility was able to be added to the initiative.

Specific Initiatives

The most significant knowledge management initiative to be undertaken at the Bank was aimed at changing the organisational culture. The Bank recognised that although this change had the mandate of the senior management group, it would require much more than this. To facilitate the change, three key areas were identified. First, it was understood that it required leadership by example. Shaping culture is critical to an organisation's ability to manage its knowledge more effectively (Gold, Malhotra, & Segars, 2001), and an important aspect of culture is the vision that is presented from top-level management (Davenport, Delong, & Beers, 1998). The initial vision had been shaped by the then deputy governor, and mandated by the governor, it was important that this high-level support was seen to be continued. Unlike many organisations embarking on knowledge management initiatives, the relatively small size of the Bank was to prove advantageous, as it was possible to sustain strong lines of communication. As the CIO points out:

> There are about 215 people located in this building. If I can't walk to everyone of them and tell them something, there is a problem. In this way, it could be seen that the initiative was being supported at the highest levels in the organization (Anand, 2004).

To further enhance the leadership role and embed knowledge management into the organisational psyche, the Bank identified knowledge management as being a core competency for all managers, and a key element of the appraisal process. Within the performance appraisal, knowledge sharing was broken into multiple statements and the employees measure themselves as to where they think they are at on a scale of one to five, with one being "needs lots of development" and five being "walking on water." The manager then carries out the same assessment. The idea being that once both parties have completed the assessment, they then sit down and look at any gaps or discrepancies in the assessment. This method of assessment has been received well and has prompted staff to look at how they are sharing knowledge in terms of documentation and both internal and external networking. The appraisal is not linked to pay, therefore there is no disincentive attached.

Knowledge management also became an integral part of the Bank's recruitment program, and was used during the recruitment process to capture candidates' thinking on knowledge management and determine their likely approach.

The second key area of priority in terms of changing the organisational culture was to increase opportunities for collaboration. Prior to the onset of the initiative, the Bank had begun to move to open-plan offices for the whole organisation. Only the chief executive and the deputy chief executive retained their own offices. The driver for the change had not been an overt attempt at increasing knowledge sharing. Rather, it was the initiative of a new head of department in the policy area. One of his first observations was that the current environment, comprising individual
Appendix 2: Knowledge Management in Government Cases

offices, was not conducive to facilitating policy making, and did little to promote communication between staff. This initiative initially met with strong resistance principally because staff equated offices to status. By removing the offices, individuals felt that they no longer had particular status within the organisation. Having observed the resentment toward the plan, the head of department first took the time to explain the reasons behind the change. However, there continued to be resistance within the workforce, with some staff feeling so strongly that they threatened to leave. This did not eventuate and the change was made. Ironically, three years later, with the Bank still located across a number of floors, the staff requested that the Bank relocates to a single floor location to remove barriers to communication. Another of the key concerns put forward by the staff prior to the change, was that an open-plan layout would be noisy and interfere with their ability to concentrate. In the initial stages, the open-plan approach was found to be noisier; however, complaints about this soon died away and people were now talking far more than when there had been the physical barrier of the offices.

The third area identified as a potential contributor to facilitating a change in organisational culture was the provision of incentives for knowledge sharing. This area has generated much thought within the knowledge management literature and the Bank was not convinced that the introduction of incentives, particularly in terms of financial rewards, was necessarily a positive step. Through careful research, the Bank found that although this approach had appeared to work in other organisations, some problems had occurred. These problems included determining the value of the knowledge and the need for increased payments for greater amounts of knowledge to avoid some being held back. The literature in this area is also divided. While some posit that that productivity and quality occur within corporate cultures that systematically recognise and reward individuals, both symbolically and materially (Willmott, 1993), others argue that extrinsic rewards, such as monetary awards, will have a negative impact on intrinsic motivation (Deci & Ryan, 1985). The Bank decided that while it would continue to monitor developments in this area, the incentive approach was counter to what it was trying to achieve in terms of its culture.

The gaps analysis also made apparent difficulties in the availability of information in terms of access and integrity. A good example of this was the proliferation of contact databases operating within the Bank. It was common for each database to contain the same or similar information as that contained elsewhere and there was no common system for updating or deleting material. As a consequence, there were significant overlaps, data redundancy, and integrity-type issues. In addition, access was not available to everyone and some staff were still operating using business cards. The approach to this problem was to consolidate the databases in order to bring the contact information into one location.

On the surface, consolidation of the various contact databases appeared to be a very low-level issue. In reality, it was one of the most difficult and time-consuming projects that was undertaken. The main difficulties arose from the reluctance of individuals to move from their own contact database, which in some cases had been used for over 15 years, to a database that would be maintained centrally and where access would be available to all.

A large project team was formed to work through the issues that the changeover presented. The project team consisted of three working groups each consisting of 12 people. With the participation of the working groups, a new intranet solution was identified, and the changeover commenced. In order to ensure that the changeover ran as smoothly as possible, the Bank ran multiple training seminars and carried out a great deal of one-on-one hand-holding. Today, the
intranet is the primary contact source within the Bank and has been extended to include a contracts link so that all the contracts held within the bank are also held centrally. However, as the CIO states:

I know that probably some people have still got business cards. You can’t force people to give them, but now if you spot an anomaly you can fix it, and that updated information is available to everyone (Anand, 2004).

In total, this process took 18 months, which was longer than expected, and was mainly due to the reaction to the change and the feelings of loss of direct control.

The Bank also undertook a review of all of its electronic records and document management activities. The Bank had been an early adopter of document management and had a system in place since 1993. The gaps analysis had shown there were several areas in which the Bank could improve its document management activities, including better management of all external and internal information resources such as the integration of e-mail. Although the current system captured a significant amount of external documentation, the aim was to now electronically capture internal documentation as well. Successful capture of both internal and external documentation would result in staff having a wide and ready access to a range of information.

In contrast to many organisations, the Bank operated as a totally open organisation, which meant that there was no security on any documents, including the discussions of the senior management group. The culture within the senior management group was to discuss why such documents would not be shared in the organisation, as opposed to shared. The only exceptions to this policy were around market-sensitive information on monetary policy where information remained private to protect staff from the results of any leakage, and the staff understood and accepted this. Mintzberg (1979) sees this form of semiadhocracy as one that facilitates knowledge sharing and an intensity of knowledge work, and is particularly appropriate in a knowledge-based organisation comprised of professional knowledge workers.

The review of the document management system was initially considered in terms of a data warehousing issue; however, as the review progressed, it became clear that the issues were more about providing a single point of access to information. As a result, data warehousing was removed from the agenda.

The review is ongoing, with the project team about to introduce the potential new solution to the wider organisation. With the experience gained from the integration of the contact databases, it is at this point that the CIO believes the document review program may encounter possible resistance as the current solution has been in place for 10 years. To counter this, the Bank has in place an extensive change management strategy, which includes "fun parts," strong messages, as well as heads of departments taking an active role in promoting and selling the messages to their respective departments.

There were also a number of smaller initiatives, including increased use of information mapping techniques, as well as use of scanning with a pilot on how best to enable access to documents that were not currently available online.
As well as improving the Bank's infrastructure tools, some of these initiatives are also intended to reinforce the values of the organisation, for example, in support of providing a family-friendly environment.

**CURRENT CHALLENGES/PROBLEMS FACING THE ORGANIZATION**

The Bank has committed sizeable resources to the initial development and subsequent implementation of knowledge management strategies. These have resulted in significant benefits to the organisation, the most important of which was to mitigate the risk of loss of knowledge through staff departure. There are several other subjective benefits that the Bank attributes to knowledge management, including the culture of the organisation, the extent of current knowledge-sharing practice, and the accessibility of a wider range of documentation of all staff. Despite the difficulty in quantifying the potential benefits of knowledge management, the Bank was, from the outset, comfortable with the idea that the potential benefits were not easily measurable.

The Bank's journey to knowledge management has been a holistic one, and has focussed on culture, structure, and infrastructure. In some ways, the CIO regards technology as the easy part and believes that the greater challenge is in bringing about the change, especially when benefits are more intangible. Change is easier to enact when it can be hooked to something rather than change for the sake of change; therefore, technology is often used as the hook. However, he stresses, that from the Bank's viewpoint, knowledge management is not all about technology. It is not the technologists but the information manager who has responsibility for the Bank's knowledge management strategy. He said:

*They're the ones who are used to thinking about unstructured information, whereas if I was to give it to a technology person, they'd be trying to put a structure round it. When you do that, you're going to lose a lot of value from it (Anand, 2004).*

There are still several strategies that have not yet been put into place. Although the review of the document management system is partially completed, the introduction of a potential solution is seen to be one that will potentially meet some resistance. The Bank will approach this with the insight gained from previous initiatives and with the experience of knowing that while the road may at times be difficult, the view from the other side is generally better.

There has certainly been progress made in terms of recording past decisions. This has mainly been achieved by targeting individuals developing an e-mail-centric organisation whereby the majority of discussions and debate are captured in threads within e-mails. This has proved successful to date, but moving forward, there may be less use of e-mail and so the Bank will need to initiate alternative approaches to formalise some of the processes.

There are also a number of legacy systems operating within parts of the organisation, such as Human Resources. The integration of these is being addressed in the single point of access activity. At this point, the project is still largely in the stages of trying to understand exactly what is the boundary and scope of the project.

The Bank is also investigating the idea of "yellow pages," a system of identifying those within the organisation with specific expertise. The context of the system will be somewhat wider than other systems in operation in that the extent of the experience will relate not just to that of the
person's job but in terms of their wider experience. A good example of this is a staff member who survived the Kobe earthquake in 1995. He has talked to many groups within the Bank about preparedness and issues such as business continuity. Although that experience may not relate directly to his position at the Bank, it is invaluable in the wider context and makes him an excellent knowledge source for a yellow pages system.

An ongoing challenge for the Bank, like several other organisations, is that of continuing to meet the ongoing business demands with the level of available resources. In that environment, keeping knowledge management in the forefront is a challenge and needs to be achieved through practical initiatives that can demonstrably provide tangible and/or strategic benefits. This requires commitment from within the organisation as well as ongoing communication. In the Bank's case, it looked on knowledge management as a sunk investment and focussed on getting acceptance to the framework. Once this was completed, it provided a reference point for the specific initiatives that could be looked at in terms of how well they delivered against the framework.

Culturally, the Bank is at an interesting crossroads. The organisation is becoming wary of what might be termed as "consulting labels." As the organisation's awareness of knowledge management concepts has increased, the term "knowledge management" has become a less favoured label. As a result, one of the challenges for the Bank is to progress the knowledge management initiatives but package them differently.

There is also a need to move the Bank's ongoing development of knowledge management strategies to the next level. To date, a best-practice-based approach has provided a good framework for the Bank. However, one school of thought for ongoing evolution is to explore the more unstructured process for developing knowledge management strategies. Embracing complex adaptive systems theory, this approach can be used to create a sense-making model that utilises self-organising capabilities to identify a natural flow model of knowledge creation, disruption, and utilisation (Snowden, 2002). Snowden concludes that the enabling of such descriptive self-awareness within an organisation will provide a new simplicity that can facilitate new meaning through the interaction of the formal and informal in a complex ecology of knowledge (Snowden, 2002).

EPILOGUE AND LESSONS LEARNED

Epilogue

This case illustrates the challenges inherent in implementing knowledge management initiatives into knowledge-intensive organisations. With no tried-and-true frame-works or models to follow, organisations, such as the Reserve Bank, must grapple with devising and implementing strategies appropriate to their own needs and circumstances. Although it is unlikely that prescribed knowledge management implementation strategies will ever be off the shelf in the sense of providing an easy and effective solution for any given organisation, it is possible to foresee a time when a great enough body of research and practice has been accumulated to offer an organisation such as the Bank enough successful models of knowledge management implementation to pick and choose strategies that might be appropriate to at least begin working with. This case helps point the way forward for others by detailing the journey of one organisation that is seriously pursuing a comprehensive programme.
Lessons Learned

Knowledge management is not a project; it is a continuum

At the outset, the Bank viewed knowledge management in terms of a project, with a distinct time frame and process. In broad terms, knowledge management was viewed as a problem that required fixing. In retrospect, the Bank considers that knowledge management is not a distinct task, but rather as the way you work, encompassing all aspects of the organisation. Essentially, it is an intrinsic part of an individual's approach to work, as well as intrinsic to the Bank's culture.

Committing to a framework that will evolve in a more organic way

In keeping with the view of knowledge management as a continuum, commitment to an organically evolving framework retains a close alignment to the individual nature and requirements of the particular business environment. This avoids the need to put a tight structure around things, which is likely to constrain thinking and result in a less-than-optimum result. While best practice can work well, essentially it is transferring someone else's idea to your individual business circumstance, and can stifle innovation because you are constraining yourself to what others have done. Rather than applying scope and boundaries from others, the challenge is to say, "let us just throw everything up in the air and see where it lands."

It is not exclusively about technology or business process or culture; it is a combination of culture-change initiatives with technology as an enabler.

The combination of technology and business process were important components of the Bank's knowledge management initiative, but neither was considered in isolation. The Bank's knowledge management program necessitated changes to the way things had previously been done. Change is often easier to enact when it has a hook. Often, technology is used as the hook for facilitating change.

High level of commitment from within the organization

The Bank's knowledge management program was sponsored from the highest level, the governor. If this top-level support had not been apparent, it is believed that the Bank would not have made as much progress as it did. Although it could have been pushed, to a certain extent, by the CIO, there were a number of business cases where the projected benefits were intangible and not able to quantified. Without high-level support, it would have been difficult to secure funding for these business cases in the absence of a tangible return on investment.

The intangible nature of benefits

The benefits derived from knowledge management initiatives are often intangible and hard to quantify. Most organisations require a strong business case to be in place before committing funds to an initiative or project. The Bank found it difficult to identify and measure benefits in terms of financial return and was therefore unable to present these as part of its business cases. The Bank took the approach that by addressing the problems that existed, this would result in intangible benefits, such as a happier workforce, thus leading to increased productivity. The investment was, therefore, more a strategic investment in the business in the long term. Success of earlier business cases has also added support for future business cases.
### Appendix 1: Reserve Bank

**Financial Position 2002 / 2003**

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2003</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>June</td>
<td>June</td>
</tr>
<tr>
<td></td>
<td>($m)</td>
<td>($m)</td>
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<td><strong>Assets:</strong></td>
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<td>Foreign Currency Financial</td>
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<td>Local Currency Financial</td>
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<td><strong>Total Assets</strong></td>
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<td>11,684</td>
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<td><strong>Liabilities and Equity:</strong></td>
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<td><strong>Equity</strong></td>
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<td><strong>Total Liabilities and Equity</strong></td>
<td>11,465</td>
<td>11,684</td>
</tr>
</tbody>
</table>

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**Graph 1**

**Composition of Liabilities and Equity**

Financial year ending 30 June 2003

- Foreign Currency Financial: 43%
- Local Currency Financial: 27%
- Currency in Circulation: 24%
- Other Liabilities: 2%
- Equity: 4%
APPENDIX 2:
THE RESERVE BANK
FINANCIAL PERFORMANCE 2002 / 2003

<table>
<thead>
<tr>
<th></th>
<th>2002 June</th>
<th>2003 June</th>
<th>Actual ($m)</th>
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<tr>
<td><strong>Operating Income:</strong></td>
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<tr>
<td>Net Investment Income</td>
<td>200.7</td>
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<td>215.6</td>
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<td>Other Income</td>
<td>10.3</td>
<td>9.0</td>
<td>9.3</td>
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<tr>
<td><strong>Total Operating Income</strong></td>
<td>211.0</td>
<td>230.0</td>
<td>224.9</td>
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<tr>
<td><strong>Operating Expenses:</strong></td>
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<td></td>
</tr>
<tr>
<td>Personnel</td>
<td>15.6</td>
<td>16.0</td>
<td>15.6</td>
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<tr>
<td>Asset Management</td>
<td>5.0</td>
<td>4.0</td>
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<td>New Currency Issued</td>
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<td>4.5</td>
<td>6.1</td>
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<td>Administration</td>
<td>1.1</td>
<td>1.4</td>
<td>1.0</td>
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<tr>
<td>Other</td>
<td>9.3</td>
<td>10.5</td>
<td>9.1</td>
</tr>
<tr>
<td>Loss on Disposal of Property</td>
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<td>0</td>
<td>0</td>
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<tr>
<td><strong>Total Operating Expenses</strong></td>
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<td>35.8</td>
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<td><strong>Operating Surplus</strong></td>
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<td>193.6</td>
<td>189.1</td>
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<td><strong>Net Expenditure under Funding Agreement</strong></td>
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<td>26.9</td>
<td>26.3</td>
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<tr>
<td><strong>Surplus for Appropriation</strong></td>
<td>175.0</td>
<td>193.6</td>
<td>189.1</td>
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<tr>
<td>Transfers to Equity</td>
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<td>4.1</td>
<td>4.7</td>
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<tr>
<td>Payment to Government</td>
<td>168.9</td>
<td>189.5</td>
<td>184.4</td>
</tr>
</tbody>
</table>

**Graph 2**
Composition of Operating Expenses
Financial year ending 30 June 2002

**Graph 3**
Appropriation of Operating Income
Financial Year ended 30 June 2002
APPENDIX 3: WORKSHOPS USED TO IDENTIFY AREAS OF FOCUS