Knowledge management, knowledge based systems and the transformation of government

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Contents

1 Introduction

This paper suggests that within the next 5 years, we will see a radical transformation in the way that government delivers knowledge-based services. These services include a vast amount of the work that operational agencies currently perform, advising or determining the entitlements of clients.

The change will be enabled by the use of advanced *knowledge-based technologies*, that will make it possible for non-specialist staff to effectively and reliably conduct complex transactions. Those transactions are currently performed solely by government staff or, in limited situations, private sector consultants. Section 2 of the paper introduces this broad change and the enabling technologies.

Section 3 of the paper suggests that these technologies will lead to a diversification of service delivery techniques for most operational agencies. This will be accompanied by a radical restructuring of how government organises the delivery of its services. The major effects of this restructuring will be the replacement of the current two tier agency-client service delivery model, to a more complex five tier model, consisting of five discrete functions:

- a more complete separation of the *policy development* function from service delivery;
- the definition of a new function of *service delivery brokerage*, which some specialist government agencies will take up;
- the large-scale use of *authorised service delivery agents*, coming from the government, private and community sectors, accompanied by a large-scale shift in funds from operational government agencies to the private and community sectors;
- the rise of *client self-service* for many transactions with government; and
- the rapid rise of an informal, unplanned *community service delivery* network, based in the community and private sectors, which over time is likely to become the dominant service delivery vehicle.

These changes will clearly have profound implications for the roles of staff in government agencies, and for the dynamics of interaction in the service delivery function. Section 4 of the paper examines these changes in staff roles, work structures and required skills, describing three suggested stages of transformation.

These changes will not be limited to Australia, but will accompany a universal redefinition of the role of government. The momentum for these changes, the frameworks for them, the accepted wisdom of public sector management theory and the aspirations of governments around the world have been converging over the past 5-10 years, making this shift almost inevitable.[1] The rise and acceptance of the Internet and the maturing of enabling technologies are the factors that will give this convergence of aspiration and theory the necessary practical impetus and see a rapid move to implementation of the new frameworks.

These structural changes will have their roots in the ways that knowledge-based organisations are able to capture and exploit the knowledge that drives their business – dynamic knowledge management techniques.

[1] In this regard, see the consistency of published aspirations on electronic government service delivery, across a range of countries, in the documents listed in the *International* section of the Bibliography.

1.1 Why is Knowledge Management Important?

Knowledge management can invite dismissal as the latest management fad. However, real and imaginative management of knowledge will enable an organisation to fundamentally change and improve the way that it works. Most current knowledge management projects or strategies don't yet extend to this.

The first stage in many agencies' knowledge management strategy is simply to improve the quality of use of information within the agency. It is possible to gain incremental improvements in performance through better storage and retrieval of information, but this improved handling of passive information will not lead to radical shifts in approach and technique.

This is a preliminary stage, and is not really *knowledge* management. Once knowledge-based service industries learn how to capture and dynamically exploit the knowledge that forms the core of their business, fundamental changes become possible.

Our society already embeds a sophisticated system of knowledge management in the way that we organise. Stove-piped, vertical segments of the workforce deal with particular fields of knowledge – lawyers deal with law, doctors deal with medicine, accountants deal with accounting, government agencies deal with government entitlements. Knowledge is currently an essentially human preserve – we rely on knowledgeable people to perform knowledge-based social transactions.

This is about to change. What will change it is the use of computer systems that encapsulate useful levels of knowledge – knowledge-based systems[2]. These systems will enable changes in knowledge management techniques that are so profound, they will quickly lead to changes in the whole model that we currently use for the delivery of knowledge-based services.

Knowledge-based systems have the capacity to effectively distribute certain types of knowledge – they provide people with the capacity to conduct unfamiliar and complex transactions reliably.

The use of knowledge-based systems is likely to occur in three stages:

- first, they will be deployed within organisations, to improve the quality of delivery of knowledge services;
- secondly, they will enable the restructuring of service delivery within organisations, as staff will be able to work across broader subject areas;
- finally, they will be used beyond the boundaries of those organisations – the work that an organisation currently performs internally will be performed by external agents.

The first two stages will have a significant impact on the roles and self-image of staff and the work structures within those agencies. This impact is examined in Section 4 of this paper.

The third stage will have an impact on many social structures. The dynamics of knowledge distribution, which have shaped many of our social structures, will be rapidly and irrevocably altered. This is explored further in Section 3 of this paper.

Systems that encapsulate knowledge about how to perform complex tasks will transform knowledge-based service industries. As we shall see, they have already revolutionised banking.

[2] For the purposes of this paper, I define *knowledge based systems* in a broad functional sense: any system that provides a person with the capacity to perform a task, for which they previously required some specialist knowledge. This definition is broader than the accepted definition of *knowledge base systems*, a specific branch of artificial intelligence. I believe that the practically-defined term is ultimately more useful.

1.2 The Banks' Dispersal of Knowledge

1.2.1 How do we bank today?

The last 10 years have seen great changes in the ways that most of us interact with banks. I want to examine two modern transactions, and explore the ways in which they illustrate changes in the interaction between customers and banks.

I use bank web sites (virtually any bank, not necessarily my own) to test various scenarios for loan repayment. Almost every bank provides a loan calculator on their web site. I can create scenarios, changing various loan parameters: the amount of the principal, the interest rate, the term of the loan, and the frequency of payment. From this, I can discover the repayment rate. Or I can enter a different repayment rate, and see the effect on the term.

This is a relatively simple transaction. There are two points of interest in it. First, while it may not require daunting mathematical skill, I don't immediately know how to do it from first principles. But, using these calculators, I can perform the task. (This is true of almost any function using a calculator – people who don't know how to derive trigonometric, logarithmic or other complex functions can get reliable answers using appropriate technology). *I can complete a useful task, without knowing how to do it in the traditional way, using a technical aid.*

Secondly, if I wanted to get this information in the past, I went to a bank and consulted a member of staff who could advise me on various scenarios. Now, I do it myself. I no longer rely on a trained staff member.

The second transaction is even more familiar. I use an ATM to transfer money from my operating account to my credit card. This is a simple transaction, and requires only mild familiarity with using an ATM.

What would this transaction have involved before the introduction of ATM's? A bank teller would have performed the transaction. They would have needed to understand both the nature of the composite transactions (a withdrawal and a deposit), and all of the bank's internal paper-based processes required to complete the transaction: check the withdrawal form, stamp it with Stamp X, place the main form in Tray A, return the stub to the customer, check the deposit form, stamp it with Stamp Y, place the main form in Tray B, note the deposit in the right way on List C, return the stub to the customer, enter the details of both transactions on the correct screens in the bank's computer. This procedural knowledge is now not required for me to perform the transaction using the ATM.

1.2.2 A transfer of banking knowledge to consumers

These two relatively simple transactions each formerly required quite specialised knowledge. The first required substantive knowledge: how to perform a calculation from first principles (or how to use the bank's internal calculation aid). The second required procedural knowledge: knowledge of internal administrative processes. My lack of these sets of knowledge effectively made me reliant on bank staff for the performance of these transactions.

The systems that now make these transactions directly available to me don't simply deliver information, they incorporate and deliver knowledge – how to do something, how to complete a transaction. The systems *encapsulate* the knowledge required to complete the task, and make it available. Neither transaction was ever inherently prohibitively complex. They were simply opaque to me. But by encapsulating the requisite knowledge in a system that I can easily use, the transactions have been made directly available to me.

Making these transactions directly available in this way has radically and permanently changed the structure and roles involved in banking. I now operate the bank's systems directly, without the need for an intermediary from the bank to help me. I also access banking services with greater flexibility, control and convenience. The banks have drawn me further into the business of banking.

1.2.3 The social impact of knowledge dispersal

This change in roles has had a huge impact on the operations of banks: reductions in staff numbers, changes in staff roles, closure of branches and so on. But the changes reach much further than that.

Where do you do your banking? At supermarkets and service stations? Using ATM's? By phone or the Internet? Through the entire web of retail outlets that now constitute de facto branches? Through automatic bill-paying arrangements with your employer or bank?

Banks have largely shifted from being directly responsible for the *delivery* of traditional banking services, to becoming responsible for the *facilitation and co-ordination* of delivery of banking services. Only a very small proportion of banking transactions are conducted through personal interaction with bank staff. Most transactions take place through the host of new physical and electronic outlets.

This shift has been enabled by technology that removes or reduces the need for knowledge: ATM's, EFTPOS machines, telephone systems, Internet bank sites, direct billing systems and so on. It means that the banks are now reliant on this technology. It has profoundly changed the fundamental structures in banking: which players in society deliver banking services, the role of banks in delivery of banking services, the functions that banks must perform in this new role, the functions of staff within banks and the customer's role in banking. It also means that the cost to the banks for most transactions is a minute fraction of the former cost of delivering services personally.

Technologies that encapsulate knowledge have completely changed the face of banking in a relatively short time. There is fairly widespread community discontent about the declining levels of personal banking services, particularly in regional areas, a lesson that government must take note of. However, we have quickly accepted the beneficial aspects of this proliferation of virtual banking outlets and techniques: increased convenience, twenty-four hour access to funds and more flexibility. We can easily overlook the vast shift in social dynamics involved in this dispersal of banking activity through the community.

Will the same thing happen in government? What will on-line delivery of government services look like? Who will deliver services? What will the staff in government agencies do?

2 Transforming Government

2.1 Is Government like Banking?

Government is quite unlike banking in many ways, and few of us would wish to see all of the changes in banks' service delivery repeated in government. However, the changes we have seen in banking provide a reference point for us to look at how government service delivery may change (and which mistakes should not be repeated).

Government is largely a knowledge-based service industry. Many government agencies are purely concerned with the delivery of knowledge-based services. They conduct, arrange, supervise or audit transactions that have no physical component: the determination of visa status, the granting of social security entitlements, the assessment of liability for taxation, the granting of licences and permits, the determination or supervision of workers' compensation entitlements, the regulation of business activities, the grant of investment entitlements…..and so on.

These knowledge-based services revolve around making decisions based on legislation, providing advice on the application of legislation and auditing compliance with legislation. The *knowledge* on which the services are based is knowledge of government legislation, regulations, policy and administrative process. This knowledge is the business of government.

The clients of government currently rely on staff of government agencies to deliver these services personally. If my father wants to claim a veteran's pension, he must fill in forms and discuss his claim with an officer from the Department of Veterans' Affairs. The officer will apply his or her knowledge to determine the fate of the claim, and to process the claim in accordance with the administrative procedures of the Department. It's like banking was ten years ago.

Can knowledge-based technology encapsulate this knowledge and make transactions with government less opaque and therefore accessible to people other than trained agency staff?

Many of these transactions are more complex than most banking transactions (things like calculating loan scenarios and transferring money between accounts). There is a far greater variety of transactions, covering all government agencies, each with their own legislative schemes to administer. Many of these transactions require detailed knowledge of complex legal and administrative requirements. Many require consideration of evidence and the exercise of judgement. These transactions inherently require a great deal of knowledge if they are to be reliably performed. Is it legitimate to compare this environment with the banking environment?

Advanced knowledge-based technology can and is now increasingly used in these government transactions. I suggest that within five years, this technology will have become the standard means of conducting even the most complex transactions involved in the delivery of government's knowledge services. The use of the systems will enable a transformation of government service delivery. This transformation will not duplicate the changes in delivery of banking services, but it will be at least as profound.

2.2 Knowledge-based Systems for Government

2.2.1 What are they?

Knowledge-based systems have the capacity to capture and deliver the knowledge that is currently the preserve of trained government staff. This chiefly means knowledge of the legislation, regulations, policy and procedures that determine entitlements and the outcome of transactions.

That knowledge forms the basis of a great deal of government operations, and of the community's interaction with government. Any agency which services a segment of the community by determining entitlements, rights, licences, required process, levels of compliance or access to schemes will be heavily involved in this delivery of knowledge services.

Knowledge-based technology, and particularly expert system (or rulebase) technology allied with other techniques, is able to change the way in which we handle that type of knowledge. Rather than simply providing passive access to the relevant legislation or policy, so that a person can read and learn it, these systems provide a dynamic means of interacting with the material, more suited to the situations in which people need to use the material.

These types of knowledge-based systems have the following characteristics. The systems:

- conduct an intelligent investigation of how the legislation or policy might deal with the client's situation, collecting information in a structured interview, identifying and only pursuing paths that apply to the client;
- prompt the user to consider each of the very specific requirements of the legislation or policy, guiding this consideration to ensure that only issues relevant to the immediate client are considered, and that all appropriate issues are considered;
- provide the user with access to research material for each of these issues: explanatory commentary, examples, past cases, proof requirements, court and tribunal decisions and any other useful research material;
- determine the logical application of the legislation or policy, in the light of the decisions the user has made on individual issues;
- are able to provide a comprehensive and coherent audit trail, explaining precisely which provisions of the legislation or policy are satisfied and how;
- are able to generate documents recording the data collected and the determinations reached, together with any explanation, instructions for clients or other useful text;
- can feed the detailed data that they have collected, and the conclusions reached, into databases for storage or for later policy analysis.

A rulebase system can therefore model a piece of legislation, and then guide a person through an intelligent and relatively simple interview, examining all of the issues raised by the legislation, and determining how the legislation applies.

2.2.2 Who uses them?

This type of technology is currently in use by several Commonwealth government agencies. The Department of Veterans' Affairs (DVA) relies heavily on it, guiding staff through complex medico-legal criteria that determine a veteran's entitlement to a disability pension. The Department has extended its use of the technology to cover different pensions and entitlements.

The Military Compensation and Rehabilitation Service uses the technology to guide staff decisions in each of the most complex areas in workers' compensation: the determination of liability, the calculation of weekly incapacity payments and the calculation of lump sum entitlements for permanent impairment. These determinations frequently require the application of complicated legislative provisions, interacting across multiple Acts and multiple versions of Acts. The system captures this complexity, and reliably guides the officer through the process of determining which

legislation will apply to a particular client, how it will apply and the entitlement that this will ultimately prescribe.

DVA has co-operated with the Military Compensation and Rehabilitation Service in developing a cross-portfolio system, to help staff and clients determine whether they have entitlements under either or both schemes. The interactions between their schemes make this a vexed question for both staff and clients. The system makes the determination reliable and transparent.

Comcare also uses this style of technology, to support officers who are determining liability for workers' compensation claims. The Australian Taxation Office has publicised its intention to use expert systems, as has Centrelink.

2.2.3 Why are they important?

The effect of these systems is to make it possible for people who are not familiar with the detail of a legislative scheme to reliably test and determine how that scheme applies in a particular case.

This process combines the capacity of the knowledge-based application to model the logical effect of legislative provisions, and to selectively guide the user through these provisions, with the capacity of the user to provide data and to make informed judgements on individual issues when prompted.

This technology does not fully automate the process of applying legislation (unless all data has already been captured) but it makes that process effectively accessible to people who don't have specialist knowledge of the scheme. This fact breaks a current strangle-hold that government staff (or private sector specialists) have on the requisite knowledge to be able to determine how legislation or policy applies.

A compelling case can be made for the immediate use of these systems in government, because of the benefits that they bring. They improve the quality and consistency of primary decision-making, particularly in areas where complex legislation, a pressured work environment and high staff turnover make that consistency difficult to attain. They enable increasing policy refinement, and ensure consistent application of that refined policy. They shorten the lead time for introduction of new policy. The benefits of using these systems, other than to broaden service delivery options, are elaborated on in Section 4.1 of this paper, and, in more detail, in [Johnson, 1998] and [Johnson & Dayal, 1999].

Advanced knowledge-based systems provide the means of overcoming the two key constraints to profound structural change in the delivery of a knowledge service:

- they provide the means whereby a person can conduct a transaction without understanding first principles – without having prior substantive knowledge of the material on which the transaction relies; and
- they provide the means whereby a person can conduct a transaction without prior knowledge of administrative processes currently required for that transaction (often by circumventing the need for the administrative process).

This means that these systems enable a person to reliably complete a complex transaction without the knowledge currently required to perform the transaction. If that knowledge, traditionally both the preserve of and the reason for government staff, will no longer be required in the future, who will perform the transactions?

3 New Structures for Service Delivery

The traditional framework in which knowledge-based services are delivered by government involves two tiers: an agency that is completely responsible for both policy development and service delivery, and a client who interacts with the agency to conduct a transaction.

This traditional framework has started to be dismantled over the last ten years. The Australian Taxation Office has moved to a self-assessment regime. This is a three-tier system, involving the ATO, clients' tax agents of different types and clients who can deal directly with the ATO. The ATO develops taxation policy and supervises the self-assessment scheme. The use of tax agents has been possible because of the existence of specialist private sector consultants, and because the economics of tax transactions make it attractive to clients to engage these consultants.

This period has also seen the rise of the language of competition: contestability, purchaser/provider splits and the separation of policy from service delivery functions. Many operational agencies have had functions market tested, though few have had their knowledge-based service delivery function tested yet. However, the creation of Centrelink as an agency solely responsible for service delivery, and its separation from the policy functions in the Department of Family and Community Services, provide a new example of a three tier framework.

Contrast both the traditional framework and this recent history with the conventional framework for delivery of many *human services*. It is accepted that human services in many fields are funded by government, but delivered by private or community sector outlets: supported accommodation, rehabilitation, family relationship counselling and mediation, disability services, aged care and so on. This is due to history, rather than to any divesting of service delivery by government agencies. But it demonstrates that a highly dispersed model for outsourcing of services can be contemplated.

Once it becomes broadly possible for people other than government staff to reliably deliver government knowledge-based services, I suggest that a new model comprising five distinct functions will appear. Several of these functions can be performed by a single agency, but there is an opportunity to separate them.

The five functions or roles are:

1. the policy development function;
2. the organisation, brokerage and support of service delivery;
3. authorised service delivery by government-appointed agents;
4. the involvement of the client; and
5. service delivery by self-nominated client agents, not specifically authorised by government – an inevitable and very exciting social development.

I will examine each of these functions in the following sections.

3.1 Role 1 – Policy Development

3.1.1 The policy/service delivery split

The last decade has seen an increased separation of policy development from service delivery. In some cases, this separation has been effected through a separation of agencies (such as the creation of Centrelink). In others, it has been effected through contracting out services to the private sector.

In yet others, both functions have been retained within a single agency, but the functions have been more rigorously separated.

Ultimately, a policy agency is likely to retain responsibility for the carriage of a program, whether it retains a service delivery function or not. The agency that has responsibility for policy is likely to be held accountable for program outcomes.

Where there is a complete separation of functions, the policy agency will therefore have an acute interest in the correct administration of policy, the effectiveness of service delivery, the efficiency and cost, the appropriateness of any targeting, the sufficiency and coverage of delivery and so on. The policy agency will be likely to have formal processes for interacting with those responsible for organising service delivery, and will want effective means of holding them accountable for that delivery.

A policy development agency is therefore likely to have two principal functions: the development of policy, and the high-level arrangement of service delivery. The agency may also retain certain ancillary functions related to policy development, such as the carriage of reviews and appeals.

3.1.2 A new role for policy agencies

The diversified service delivery model that I suggest will become ubiquitous, and the knowledge-based technologies that will support them, will create a new and additional role for policy agencies.

The separation of policy development from service delivery enables a shift away from the stove-piped mindset of traditional government service delivery in which one agency delivers its services, and clients must approach other agencies for other services. The new model of diversified, highly supported service delivery will enable and demand an integrated approach to service delivery.

An integrated approach combines the delivery of services across programs, agencies, portfolios and even tiers of government. This is the aspiration of (and a likely success criterion for) developments such as one-stop shops and life-event based transactions.

This type of integrated approach requires a policy agency to co-operate with other policy agencies, in creating the technical support that will enable this style of service delivery. It will require far greater co-operation among policy agencies. In time, it will lead to well-founded questions as to whether the separation of certain policy agencies has any real foundation in merit, rather than in the politics of allocating Ministries.

An example of the merits of an integrated approach, based on a life-event, can be seen in the discharge of a member of the Australian Defence Forces. At that moment, the client can easily have an immediate interest in military compensation transactions, veterans' affairs transactions, superannuation entitlements, medical rehabilitation, vocational training, social security, housing, financial planning, child support and job identification. Several of these issues are intertwined: qualification or the scale of entitlement to one depends on another.

Good client service would provide this discharging member with a complete, integrated, optimal package of services. All of the transactions are knowledge-based transactions. The extent to which the transactions are integrated depends very substantially on the extent to which a variety of agencies co-operate.

Integrated service delivery, focusing on the client's presentation and needs, will very frequently cross programs and portfolios. If policy agencies wish to see their programs delivered in this way, they will need to co-operate in the design of software applications and service processes that will support the integrated delivery model.

As policy agencies divest themselves of responsibility for Roles 2 and 3 (brokerage and service delivery), they may themselves be further rationalised. For a start, they will be smaller. In time, the need for close co-operation between programs in related fields may see pressure to bring those programs together within a smaller number of policy agencies, covering subject areas defined and distinguished by criteria different from those that currently define portfolios, and more closely reflecting the situations and self-perceptions of their clients.

3.2 Role 2 – Service Delivery Brokerage

3.2.1 What is a service delivery broker?

A service delivery broker has three major functions:

- developing and providing the technical applications that will enable their service delivery strategy;
- organising and supporting service delivery outlets (physical and virtual); and
- servicing the accountability requirements in their relationships with policy agencies.

The technical applications are critically important, because they will determine the possible parameters of the service delivery strategy. In this world, the value of a service delivery broker will be significantly affected by the quality of its information technology. Information technology, and particularly knowledge-based applications, will be the central enabling tools for diverse, integrated service delivery. Application Service Provision (ASP) will become increasingly important in this brokering function for government knowledge services, as it will be in other industries.

A service delivery broker is likely to be held accountable by policy agencies, through competition. The measures of success will include both the quality of program outcomes and the costs of service delivery. This broker will therefore be seeking the most effective ways of delivering services for the least money. This will foster great innovation in service delivery techniques, and rapid acceptance of reliable, low-cost techniques.

The primary *brokering* function involves many aspects of the organisation and coordination of service delivery:

- selecting service delivery outlets;
- authorising and accrediting those outlets;
- contracting with the outlets, including defining service standards and performance criteria, and managing those contracts over time;
- audit, quality control and performance measurement of the outlets;
- marketing the services, much in the way that a franchiser markets a brand sold through its many franchised outlets;
- brokering among policy agencies – organising them so as to create a coherent integrated service delivery strategy across programs and portfolios; and
- expanding the scope of services delivered, and demonstrating innovation and value deriving from their specialist service delivery focus.

The function also requires a specific emphasis on the provision on the service delivery technology:

- providing supporting IT systems and any necessary infrastructure, to enable the outlets to operate;
- monitoring the performance of IT systems, and particularly of the critical knowledge-based applications; and
- providing centralised data storage, management and analysis functions, supporting both the operational requirements of outlets and the information requirements of policy agencies;

3.2.2 Who should perform this role?

These roles may be performed by a single brokering body, or some may be contracted to other agencies. For example, the development and support of IT applications can be outsourced (ASP is a rapidly growing market, and for some agencies it will make great sense to offload this to a specialist partner). The preparation and supervision of contracts may be outsourced. The data storage, management and analysis functions could be outsourced. But the overall role is a single, distinct layer in the multi-tier framework.

This brokering function may be performed by a policy agency. In that case, this separation simply reflects the need for recognition of service delivery brokerage and support as a discrete function. If this recognition is not given, it is unlikely that the agency will retain the function for long, as specialist brokers become more common.

The Department of Family and Community Services performs both the policy and the brokerage functions across multiple human services programs. This is a well-understood role in the field of human services delivery, where government has contracted private and community agencies to deliver services for decades. On the other hand, in the knowledge-based social security programs, FACS retains responsibility for policy development, but contracts Centrelink to perform this brokering function. The Business Entry Point is an example of a new cross-portfolio broker in the delivery of government services to business. In most other agencies, the policy development and service delivery functions are, as yet, combined.

It may be that this function is performed by an agency that also provides service delivery outlets. But whether the authorised service delivery outlets are internal or external, their support, monitoring and evaluation remains a specialised role. With the increasing opportunities for diverse service delivery vehicles, many not requiring physical outlets, a service delivery agency must again recognise the need for this strategic, brokering function to be distinct and well-resourced.

The aspiration of integrated service delivery raises tensions for this role. If the brokering function is responsible for organising, coordinating and supporting service delivery across multiple programs, portfolios and tiers of government, where does that leave competition? How can a policy agency effectively make this brokering function contestable, while simultaneously integrating the delivery of their programs with those of other agencies?

I suggest that the service delivery brokering function must have responsibility for integrated service delivery. It is the role of this function to do that. Policy agencies will need to cooperate both with the broker and with other agencies to give effect to this style of service delivery. The degree of the broker's success will in part determine its value in a contestable environment.

3.3 Role 3 – Authorised Service Delivery

3.3.1 What is a service delivery outlet?

The major functions of a service delivery outlet are to deliver the required knowledge services, and to comply with the accountability requirements to whoever commissions their work. The delivery of knowledge services includes such things as:

- providing advice on the application of government schemes to a client's situation;
- guiding or advising a client throughout a claim or compliance process;
- making determinations on entitlement or compliance;
- considering evidence;
- assisting clients with scenario testing and with planning their affairs, taking into account the services that they offer; and
- integrating all of the services offered by the outlet in a way that is coherent and helpful to clients.

The encapsulation of specialist knowledge in knowledge-based applications enables non-specialist staff to reliably perform complex transactions. This fact enables the major shift of much knowledge-based service delivery from the current specialist agency outlets to external generalist outlets.

As it becomes increasingly possible to have these transactions reliably performed by non-government, non-specialist staff, there will be a compelling case to extend the range of service outlets to include both government and non-government agencies.

3.3.2 Government service outlets

Government agencies may perform this role: Commonwealth or State agencies which, through their location, economies of scale, client base, expertise or other factor are well-suited to delivering particular services on behalf of another agency.

Cooperation between Commonwealth government agencies has seen this type of agency arrangement in several areas for some time. Centrelink is the most obvious example of a specialist service delivery network. It was explicitly created to provide cross-portfolio service delivery. It now delivers services for a number of government agencies, having complete responsibility for delivery of some programs and a convenient agency role in regional areas for others.

3.3.3 Private sector outlets

These outlets can also come from the private sector. There is likely to be a greater potential role for existing client advisers in the private sector: doctors, lawyers, accountants, financial planners and so on. There is also likely to be greater diversification of existing private sector outlets: tax agents such as H&R Block, and banks who are becoming involved in the delivery of process-based transactions. There may also be a new breed of private sector players: "Government Agents" who will deal with clients' interactions across many government areas, trading on their capacity to use the advanced knowledge based systems that will enable this.

Many private sector players will seek to take on this role, because of the value that it adds to their existing service mix. This will be likely to offer economies to government, as the cost to

government of many transactions is reduced: the cost can either be effectively transferred to the client, or the government can pay on a per-transaction basis at lower rates than current overall administrative costs.

3.3.4 Community sector outlets

The community sector offers a particularly dynamic range of outlets for many types of service, and for many integrated services. Neighbourhood centres, community centres, financial counsellors, Community Legal Centres, women's centres, health centres, trade union offices, refuges……there is a vast network of community agencies that deal with government clients daily. These people often act as unofficial advisers or advocates in government transactions already.

Community sector agencies will be likely to be very willing outlets for direct delivery of many government services, particularly if this is accompanied by funding. The use of these agencies for the delivery of many types of services would provide clients with more convenient, trusted and comfortable means of conducting their business with government, particularly in rural and regional Australia. It would be likely to lead to efficiencies in the community sector-government interface, as well as providing major efficiencies within government.

Commissioning community sector agencies to become outlets for the delivery of government services has a range of ancillary benefits. Over time, it would be likely to lead to a large-scale transfer of administrative funding from government to this sector (as happens in outsourcing to the private sector). This is likely to provide more stability for local community sector agencies, and to emphasise and extend the role of these agencies in the life of local communities (whether geographic or demographic). This, in turn, is likely to lead to a strengthening of community self-image, self-reliance and self-administration. Finally, it is likely to lead to a greater professionalisation of this sector, which can, once again, strengthen local communities.

3.3.5 The need for a service delivery strategy

The Service Delivery Broker is obviously in a position to very significantly determine the mix of authorised outlets and therefore the social impact of this diversification of outlets. Choices that are made in selecting outlets will substantially define the future style and flavour of community interactions with government.

This means that one of the primary roles of the brokering function may be to identify the comparative social impact of fostering service delivery outlets in different sectors. The preferences of clients and comparative costs will clearly be important in this analysis. But broader social issues, such as the relative impact of different service mixes on different types of community, may also be worth considering.

If the strategy includes Internet-enabled delivery, the service delivery broker will have a more broad-ranging and precise capacity to monitor client preferences and feedback than is possible at present. The democratic nature of the Internet invites high levels of feedback on all aspects of service delivery. This feedback can be unstructured, simply inviting comments, or a structured evaluative component of service processes.

High levels of monitoring and feedback, and their incorporation into performance measurement processes, are essential adjuncts of this type of flexible, dispersed service delivery model.

3.4 Role 4 – The Client

3.4.1 Direct client self-service

The client is a player in the current two-tier service delivery model. However, the client is currently relatively passive, helpless and almost wholly reliant on the knowledge of government staff or hired professionals.

Knowledge based systems will provide clients with the capacity to conduct many transactions directly themselves. I include, in this model of "self-service", service with assistance from family and friends.

A host of simple transactions will become immediately more accessible to the client. These simple transactions are akin to those that we all currently conduct with banks. As soon as the facilities are practically available to people, via kiosks, shopfronts, telephone facilities and the Internet, people will take on self-service for a broad range of simple enquiries and transactions. This will include such things as changes of address, checking on the status of transactions, obtaining forms and so on.

But knowledge based applications will make far more complex transactions available for self-service. The take-up of self-service for these transactions will vary wildly across transaction types, client segments and agencies. The quality of the systems, the extent to which they are known, and the effective access that clients have to self-service outlets will be key determinants of take-up.

3.4.2 Assisted self-service

Where self-service is beyond clients, the provision of these applications will readily enable Role 3 outlets (appointed agents) to assist clients. In addition, this situation is likely to drive the emergence of outlets performing Role 5 (unofficial service delivery agents), described in the next section. I suggest that the majority of clients, given the choice between conducting a transaction in a government office or somewhere else, would currently be likely to choose the latter. This may change as specialist service delivery agencies improve the relationship between government and clients.

"Self-service" therefore becomes a euphemism for any situation in which a client chooses a means of completing a transaction, using a facility that removes the need for government staff to be involved. This notion emphasises a client's capacity for and exercise of choice in determining the style of service he or she is comfortable with for a particular transaction.

In this picture, the client is a far more active, empowered, dignified and self-reliant player in securing government services, whether that client chooses to use direct self-service facilities or not.

This picture places the client in a market situation. The market is not for the ultimate product, but it is for the service through which the product is secured. The market can therefore dictate the most efficient, effective, desirable styles of client service.

3.5 Role 5 – Unofficial Service Delivery Outlets

3.5.1 Opening Pandora's Box

The Internet has repeatedly and eloquently demonstrated the power and inevitability of feral networks, once they are enabled.

Two examples are most striking. The first is the rise of the World Wide Web. Against the tide of standards bodies, powerful multinational companies and, in some cases, national governments, the

Web has rapidly grown to become an integral part of the modern world. It cannot be turned back. It is almost completely feral, governed by no-one, controlled by no-one and, increasingly, able to be controlled by no-one.

The second, and more recent example, is the rise of Linux. An operating system developed by an unseen, free, poorly co-coordinated army of enthusiasts appears to be posing a genuine threat to the stranglehold of Microsoft in some markets.

The same phenomenon can happen in accessing government services. If agencies make knowledge-based applications available over the Internet, as is essential for many types of client service, an unofficial network of service delivery outlets may rapidly appear. This network may consist of existing players in the private sector, new players in the private sector, private agencies redefining their role, community agencies and sundry individuals.

3.5.2 Do we want to open Pandora's Box?

If the tools for conducting sufficient transactions are made available through Internet-based self-service facilities, it will not be possible to control this proliferation. But it may also be highly counter-productive to try to. It is quite possible that the new model for the delivery of government services in an on-line world will emerge from this chaotic, experimental soup. Smart, entrepreneurial players will divine new ways of servicing the needs of government clients, in ways that are very attractive to those clients. As long as these new methods do not compromise the program or accountability requirements of the policy agency, why stop them?

This is not an engineered, controlled approach to service delivery. But it may be the cheapest, the most effective, the most desirable from a client's perspective and the long-term basis of new balances in the relationship between citizens and government. It is ironic that the current language of "one-stop shops" may in fact lead to very widely dispersed service delivery.

As soon as government agencies provide a critical mass of services available for clients over the Internet, this will happen. This, in part, renders redundant the question whether clients will be able to perform complex transactions on-line. A middle ground will arise between the clients who are capable of full self-service, and the government provision of intermediaries or agents to assist clients.

This, perhaps, is where the "Government Advisers" will spring from. They may appear from community centres, they may appear in banks or insurance companies. They may appear in chemist shops, Post Offices or newsagents. They are likely to appear in neighbourhoods. They are likely to provide local contact points for clients. They are likely to be enthusiastic, energetic, innovative and very valuable agents in any strategy for on-line delivery of government services. They are likely to dramatically lower the administrative costs of government.

This tier will be more likely to arise given a certain set of conditions. The first is the use of a consistent paradigm across government for the on-line conduct of transactions. The greater the consistency and predictability of software and technique, the closer government gets to creating a standard method of interaction, the more likely it is that people can become capable across a broad range of transactions. The second is the existence of a critical mass of genuine transactions, making on-line interaction a viable technique. The third is simply the quality of the on-line facilities – whether they are genuinely usable and useful.

This unofficial tier, while unpredictable and relatively unmanageable, is in many ways the most exciting and innovative tier in the new service delivery topography. It is this tier that will really shape the large-scale dispersal of government service delivery throughout the community.

4 New Roles for Government Staff

The transformation of government delivery of knowledge services will obviously affect staff of government agencies. It will lead to a significant redefinition of the roles of staff in operational agencies.

The change in staff roles will be accompanied by a change in the skills that are valued and sought by agencies. There will also be a welter of transitional issues for current staff.

These changes will follow the likely staged implementation of knowledge-based systems in agencies, mentioned early in this paper:

- first, adoption of the systems within agencies to improve the quality and consistency of primary decision-making;
- secondly, use of the systems to restructure the way that work is performed within agencies; and
- thirdly, use of the systems to support a completely new, dispersed service delivery strategy.

I examine the impact of these changes on staff in terms of these three stages.

4.1 Stage 1 – Quality Improvement

The major focus of the first stage of adoption of these knowledge-based technologies is improvement in the administration of policy, rather than any broader improvement in the delivery of services. This accords with the usual first objective of a knowledge management strategy.

4.1.1 Improvements at the coalface

The knowledge management tools provide an adjunct for the staff member delivering knowledge services. The tools have a subtle but ultimately profound effect:

- They remove the need for the officer to remember the minutiae of the material being administered – the knowledge-based system will prompt the officer to take the appropriate next step or to consider the next relevant issue.
- This removes some pressure from the officer to stay completely up-to-date, a very substantial pressure in a complex policy environment.[3] A knowledge-based system can effectively prompt the officer on the requirements of the most up-to-date policy, and require the consideration of individual issues supported by explanatory material.
- These systems also remove some of the pressure inherent in advising clients. At present, staff delivering knowledge services have a heavy onus to be up-to-date and correct at the counter or on the phone, usually across a very broad range of policy material covering a myriad of client situations, and working in a stressful, pressured environment.

[3] In 1998, the Management Advisory Board released a best practice guide on service delivery, *Quality in Customer Service in the Australian Public Service* (November 97), which identified complex legislation as the second of five critical barriers to improved service delivery: "49% of respondents to *The Quality In Customer Service Project* questionnaire identified complex legislation, regulations and processes, which relatively junior staff are expected to administer, as hampering the provision of quality customer service". The third major barrier was lack of good IT systems, and the fifth was the rate of policy change.

- These systems will save staff time. Improvements in decision quality should reduce multi-handling of cases. More efficient processes across program boundaries can significantly increase productivity.

Use of the systems will accentuate a need for a range of generalist skills, rather than for detailed knowledge:

- While use of knowledge-based systems will reduce the need for staff to remember policy, it will accentuate the requirement for staff to exercise judgement correctly and carefully. The systems will emphasise the need to research and apply interpretative policy on specific issues. They will also make these exercises of judgement more visible to an auditor.
- These systems will emphasise the role of staff in considering evidence. The resolution of evidentiary conflicts, the pragmatic application of fair risk-management principles and the consistent treatment of evidence will become more of a focus for staff. A highly visible, automatic audit trail will provide the incentive for staff to exercise care and skill in any area of judgement.
- Similarly, skills in human interaction will be accentuated, once the primary role of knowledge repository has been removed from staff. Skills in developing rapport, negotiation, pragmatic resolution of practical issues, interpretation of facts and general client service will be more highly valued.

The reduced reliance on staff knowledge and memory of minutiae, and the increased emphasis on other skills, has an immediate effect on the focus of training. Officers will require an understanding of the policy framework and the general tasks to be performed, but will no longer be the sole operational repositories of up-to-date policy knowledge. Staff training will therefore undergo a shift in its emphasis, as skills in judgement and human interaction become more essential and more highly valued than an officer's knowledge of the minutiae of policy.

4.1.2 Improvements in policy development

The systems will also have an immediate impact on central policy areas. Policy-makers will be required to clarify and cement policy on individual issues to a far greater extent than previously. Our experience has been that a welter of previously-buried policy issues comes to the attention of policy-makers during the construction of a knowledge-based system. This process of clarification often provides the basis for consistent application of policy for the first time.

These systems also provide the means for more rapid and reliable implementation of new policy. As soon as policy can be incorporated within a knowledge-based system, it can be consistently applied throughout the country. This is both faster and safer than the current reliance on staff training to implement new policy. However, this requires policy-makers to be involved in the incorporation of new policy in the system.

Policy-makers will have access to better management information. Knowledge-based systems will tend to be more fine-grained than current IT systems, collecting information at a far more refined level of detail (usually reflecting the detail of legislation or regulatory material). This information is available for analysis, providing policy-makers with the means to examine more precisely the impact, take-up and outcomes of policy.

4.1.3 Threats and resistance

There are transitional issues involved in the implementation of these systems, particularly for operational staff. The systems devalue the developed policy knowledge of senior operational staff.

They challenge the status of those senior staff, as more junior staff members become more effectively autonomous. Where senior operational staff now gain status from their accumulated knowledge of policy and practice, that status will be diminished.

Agencies implementing these systems also face the charge of *deskilling* their staff. This is undeniably true if the agency and staff highly value the accumulated memory of minute policy detail. Knowledge-based systems will reduce the need for this knowledge, just as calculators reduce the need to remember how to perform trigonometric functions from first principles. It is likely that a smaller number of senior staff will be required for primary decision-making, dealing with sensitive areas of judgement or discretion that will continue to require specific delegated determinations.

The answer to these transitional issues is to redefine what is valued by the agency, and what accords status to a staff-member. It is generally more valuable for a staff member to develop and refine generalist skills such as judgement and human interactive capacities, rather than to rely on detailed memory of a particular portion of a legislative scheme. The former are far more marketable than the latter.

Similarly, the use of these systems will challenge entrenched local power-bases, in which policy has been applied according to local rules and local expertise. The implementation of these systems in national agencies invariably uncovers widely differing policy interpretation and application throughout the country. In most cases, an agency will welcome this new consistency. However, this also challenges local status and may cause antagonism.

The introduction of these systems requires new roles, and these roles can often provide a means of harnessing the "old experts" who might otherwise pose a challenge to the new system. System design and testing, clarification and exposition of more detailed policy, exercise of critical discretions, continuing maintenance and support of the systems, design of system implementation and associated processes, new audit, monitoring and quality control processes – all of these require experienced and knowledgeable staff. The ideal situation is to harness the expertise of the experienced staff in designing and delivering a new, and more reliable way of delivering knowledge services.

Finally, the value and acceptance of these systems, and the confidence with which policy agencies can harness them, is heavily dependent upon the impact that they have on the quality of primary administration. This means that genuine and reliable improvement in the quality and consistency of determinations is a threshold issue.

4.1.4 Will there really be improvement?

There is currently a problem in the general quality and consistency of primary government decision-making and advice. There are many causes for this. Fundamentally, the task of achieving consistency in the administration of complex legislation across hundreds or thousands of primary decision-makers is simply too difficult, using current techniques.

Many agencies delivering knowledge services are responsible for very complicated legislation, often including multiple interacting Acts or versions of Acts and policy which frequently changes. The staff delivering services often work under significant pressure, and may have high rates of turnover. Audits that our clients have conducted, examining the correctness and consistency of primary decisions, have disclosed significant levels of error. One audit identified error rates on key decisions in State offices running between 15% and 40% of determinations, with a 25% average

national error rate. There is no reason to believe that this is unusual.[4] On the contrary, there is good reason to see it as representative. There is also little reason to believe that this type of figure is able to be reduced substantially using current techniques, relying ultimately on staff training and memory.

So my point of departure on this topic is to challenge any sanguine assessment of the quality of primary decisions. My experience has been that senior public sector managers are similarly reluctant to take too optimistic a view of the consistency of primary administration.

Knowledge-based systems demonstrably improve the quality of primary decision-making. They attack entrenched, inherent weaknesses in the current techniques, which rely almost completely on the accumulated memory and capacities of an army of primary decision-making staff.

Systems that we have developed for clients have led to immediate and substantial audited improvements in the quality and consistency of decisions. The use of knowledge-based systems for this purpose by such Commonwealth agencies as the Department of Veterans' Affairs, the Military Compensation and Rehabilitation Service and Comcare, as well as the publicly proposed use of this type of technology by the Australian Taxation Office and Centrelink suggests a broad acceptance of this improvement.

Implementation of the systems both requires and assists new processes for monitoring decision quality, auditing, determining compliance with client obligations, locating and correcting errors and ensuring that the system's performance in supporting determinations is reliable. For example, it is possible, with an appropriate verification and testing regime, to have very high confidence that, as long as staff make low-level individual judgements reliably, the overall application of the legislation will be reliable. In addition, because these systems collect and store very detailed client data, it is also possible to profile categories of case very precisely, so as to investigate or correct possible errors.[5]

This first stage in the implementation of knowledge-based systems within agencies is in many ways the most challenging for staff. As we shall see, in the later stages the centrality of these systems and their necessity are unarguable, as the structure of staff work within agencies will be radically redesigned, and will explicitly rely on the systems.

4.2 Stage 2 – Work Restructuring

The second stage of adoption of knowledge-based technologies is likely to build on the first. Whereas the first stage was chiefly concerned with the quality of primary decision-making and policy administration, the second is likely to begin to focus on new means of delivering services. In particular, the second stage is likely to involve the internal restructuring of work in an agency.

[4] The reasons for errors in primary decision-making, and the manner in which knowledge-based systems improve the quality of those decisions, is examined in detail in an unpublished paper [Johnson and Dayal, 1999], presented to a seminar of the Institute of Public Administration Australia in March 1999, and available from the authors on request.

[5] The need for a holistic approach to the introduction of these systems, introducing new processes to take advantage of their strengths and to support them, is discussed in detail in [Johnson & Dayal, 1999].

4.2.1 Breaking old boundaries

Knowledge-based systems provide staff with the capacity to work across broader subject areas. They enable agencies to escape from long-standing stove-piped service structures, created when service delivery is dependent upon staff knowledge of policy and process.

Old internal program boundaries can be broken, and some inter-agency boundaries also relaxed. The notion of a one-stop shop or single point of contact for all services delivered by the agency becomes genuinely possible, because the service delivery staff require familiarity rather than expertise in the subject material.

At this point, knowledge-based systems are accepted as essential tools in the performance of a far broader range of transactions by individual staff-members. The multi-program context further reinforces the need for staff skills in judgement, handling of evidence, pragmatic risk management and human interactions. Staff will move more into the role of continuing case managers for clients, providing services across a broad range of programs, rather than performing individual tasks anonymously. The new style of administration will involve more active partnering with clients, drawing them increasingly into the conduct of transactions and the business of the agency.

4.2.2 Designing new knowledge-based processes

This shift obviously requires a great deal of design work. There are two key and complementary components requiring careful and clever design: the knowledge-based applications that enable and support new work structures, and those redesigned work structures and processes.

The application and work process design require staff with a range of skills and knowledge: an understanding of policy, an understanding of client situations and how they present, knowledge of the practical risks and issues at the point of service delivery, a good grasp of information technology and tools, creative design skills, the capacity to think laterally and redesign processes effectively, and a capacity for attention to detail in designing complex systems.

Good staff with these skills will be very valuable. They will be in demand as agencies increasingly use advanced technology to fundamentally redesign business processes. Because advanced technology will provide new techniques for performing the core business of these knowledge-based agencies, radical process re-engineering will become possible.

This new environment will reward managers and staff who are creative, skilled across both information technology and business practice, capable of lateral thought, practical and happy to embrace and create change. It will be a difficult environment for staff who are intimidated by change, and who wish to cling to entrenched ways of working.

4.2.3 More refined client targeting and service

The capacity to radically re-engineer processes, and to escape the current reliance on staff knowledge of policy, will enable a completely new approach to policy development and delivery. Complex policy issues will be able to be reliably segmented, with different handling for clients with different profiles. So, for example, there may be specific policy and handling rules for the highest risk client profiles, the lowest risk profiles, the most sensitive or the most common, or for different segments of the client population in predictable categories.

This policy refinement parallels market segmentation in the private sector: advanced technology enables a broader range of clients to be treated individually, according to their peculiar circumstances. Paradoxically, the use of knowledge-based technology enables simpler and more reliable management of complex cases, through the introduction of vastly more complexity. For

example, the Department of Veterans' Affairs has used this technology to move from generic handling of a complex issue, to precisely tailored handling for clients with each of over 200 medical conditions: clients with leukaemia have specific, precise policy and handling rules applied, different from those applied for clients with lung cancer.

This client segmentation in policy terms can drive radical changes to the service delivery structures. Precise, detailed client profiles can lead to fast-tracking of services for certain clients, to intensive, one-on-one handling for others, or even to risk-based automated completion of the transaction.

The extent to which an agency can improve the efficiency and quality of service delivery during this stage will reflect the quality of analysis and creativity that staff bring to the design process. Examples such as the Compensation Claims Processing System in the Department of Veterans' Affairs, which has led to profound and sustained productivity improvements and a radical redesign of claim processing, are testament to the opportunities offered by this marriage of advanced knowledge-based technology, policy refinement and work restructuring.

However, the complete transformation of service delivery will come when an agency moves into electronic service delivery, harnessing a range of newly available technology and infrastructure to provide services through diverse vehicles, dispersing services through the community.[6]

4.3 Stage 3 – Transformation of Service Delivery

Where the focus of Stages 1 and 2 has been on the improvement of internal service delivery, still within a traditional government framework, the focus of Stage 3 is a strategic, corporate approach to the new capability for dispersed service delivery.

4.3.1 The elements of transformation

This stage relies heavily on advanced technology, and makes it central to the business of service delivery. Those involved in developing a new, dispersed service delivery strategy must understand the capabilities and opportunities offered by this type of technology.

Planning for this stage demands analysis in terms of four of the five functional tiers previously mentioned (whether these functions are performed in-house or some are outsourced): policy development, design and organisation (brokerage) of a service delivery strategy, direct service delivery through physical and virtual outlets, and the role of the client.

These roles will become increasingly distinct. The driver for this distinction is the increasing importance and complexity of the second role – the service delivery broker (discussed further under the next heading).

Knowledge-based technologies will immediately provide an agency with the opportunity for a host of service delivery techniques that have previously been available only for relatively simple transactions:

- conduct of more complex transactions by telephone;
- conduct of complex transactions through kiosks and the Internet;
- the use of external agents in government, such as one-stop government shops;

[6]The Management Advisory Board's 1997 report on *Quality in Customer Service Delivery* identified a range of innovations for improved service delivery. The global recommendations included moves towards a one-stop shop approach to service delivery, more customer-focused IT systems and self-service.

- the use of external agents in the private and community sectors;
- self-service by clients in agency offices, in community outlets or at home; and
- the use of outreach officers for more complex transactions.

The effective exploitation of these new opportunities will require very careful analysis of transaction profiles, capacities of clients and potential agents, current operating costs and the costs and risks of deploying new techniques. But the benefits, both in terms of improved client service and improved agency efficiency, can be extraordinary (as banks have demonstrated).

Obviously, the strategic planning of new service delivery techniques becomes a critical role. Similarly, the implementation of those techniques is critical and difficult.

4.3.2 The rise of the broker

The service delivery brokering function will require a host of new roles and skills. There will be several areas in which this function will either require skills that are new to the public sector, or new techniques and greater resourcing.

Creative, thoughtful and knowledgeable design skills will be required, with an integration of design work across several fields:

- design of an integrated, comprehensive service delivery strategy;
- design of appropriate knowledge-based applications to support that strategy; and
- design of work processes that support multiple service delivery techniques, and harness the knowledge-based applications.

The central nature of the knowledge-based applications will require new skills and resources:

- construction of these applications;
- market testing of Internet-based applications with clients or agents;
- testing and verifying the correctness of complex knowledge-based applications;
- deploying substantial, complex, Internet-based systems likely to receive very heavy use; and
- maintaining complex knowledge-based applications.

The management of a dispersed network of service delivery agents will require new roles and skills:

- contracting with service delivery agents;
- agreeing on performance standards, and monitoring and evaluating the performance of agents;
- auditing staff, agent and client transactions conducted using knowledge-based systems; and
- developing mechanisms for feedback from clients, staff and agents on the use of these systems.

The relationship between the policy development function and the service delivery function will require new activity from both areas:

- supporting very detailed knowledge-based applications, through elaboration of detailed policy guidance;
- continually refining policy and client segments in ways likely to improve the quality and efficiency of program administration; and
- integrating transactions from multiple programs within an agency or across portfolios, to provide single, seamless and complete transactions for clients.

This is a new world and a new way of delivering knowledge-based services. It will clearly require a host of new skills, and render redundant a range of existing knowledge and practice. It is made possible and compelling by the rise of new technologies. The technologies and the aspirations of government will drive a transformation of the way we deliver knowledge services.

This new world will not only alter the coalface service delivery, it will have a profound impact on the appropriate roles and techniques of a range of associated public sector institutions, such as the Audit Office, the Ombudsman and a range of bodies involved in administrative review. The potential for changed roles and techniques in these areas is unfortunately beyond the scope of this paper.

5 Conclusion

Breaking a strangle-hold on knowledge is powerful. Breaking a teller's hold on knowledge of banking processes has irreversibly fractured the monolithic nature of banking. Breaking a government officer's hold on more complex knowledge-based government transactions will similarly dismantle the monolithic nature of much government service delivery.

Knowledge-based technologies provide the means of making this previously specialised, captive knowledge sufficiently accessible to outsiders, to enable them to conduct even very complex transactions. These technologies provide a means of dynamically managing knowledge – capturing it and exploiting it in completely new ways.

Much of our society is currently built on segmented knowledge monoliths – professions and jobs defined by and built upon specialised knowledge. The effective dispersal of this knowledge (rather than simply information) throughout society dramatically alters the role of those responsible for that knowledge. The role shifts from one of a repository and user of knowledge, to one of a facilitator and disperser of the knowledge.

The process of making government's knowledge usefully accessible to the community will empower the community, both citizens and business. It will provide them with the means to have greater understanding and control of their transactions with government. It will break down mystique and blind reliance, and replace that with greater self-reliance.

The dispersal of knowledge will enable new service delivery mechanisms for government. Some mechanisms can be engineered and controlled. Others will simply arise. If government is bold in providing this effective access to knowledge, it will lead to shifts in power and the rise of new social dynamics. Broad dispersal of the knowledge is likely to lead to a democratisation of government services, and to the strengthening of local communities defined by geography, interest or circumstance.

These changes rely on confidence in new techniques: confidence of the policy agencies that programs are being accurately administered; confidence of clients that they are receiving correct advice and determinations; and confidence of service delivery brokers that they can equip agents and clients with tools that satisfy accountability requirements while dispersing service delivery. The changes are only possible because the new technologies simultaneously offer increased safeguards for the quality of decisions and new opportunities for service delivery.

The convergence of IT infrastructure, the aspirations of government and the community and the maturing of advanced technology provide an opportunity that is likely to be compelling. The rise of this type of genuine electronic government, with the social changes it will facilitate, will signal the true impact of the new information age on the public sector.

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