Information and Knowledge Management

National Scoping Study Report

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The paper does not represent the situation existing in all Councils in relation to Information and Knowledge Management at this point in time, however it does present a snapshot of an indicative position and trend using both leading and a random selection of Councils throughout Australia.

This discussion paper was prepared on behalf of the Australian Local Government Association by the Local Government Online Services (LOGONS) Project at the Local Government Association of Tasmania with

- the School of Information Management at the University of Tasmania conducting the research and;
- an initial draft being reviewed by Whitehorse Strategic Group Ltd who are Strategic Consultants to the Municipal Association of Victoria for their current Networking the Nation Projects.

1. Executive Summary

Background

The Local Government Association of Tasmania (LGAT) undertook a project, "Local Laws Online" sponsored by a grant from the Networking the Nation (NTN) program and administered by the Department of Communications, Information Technology and the Arts (DCITA). The purpose of this project was to determine if there was an electronic means by which the development of By-laws, policies and guidelines could be constructed, thus saving time. The research undertaken acknowledged that the number of By-laws administered by Councils has vastly reduced, and there is confusion surrounding the interpretation of the By-laws, policies and guidelines. A second project is currently underway providing these interpretations to the public and Council staff alike. Arising from this research however, was a trend that indicated a lack of information and knowledge management frameworks and systems within Councils. Such systems become more important to ensuring the correct message is given to the customer each and every time, particularly as local government commences its foray into the provision of online services.

The other Local Government Associations (LGAs) agreed with the concept for the project and a funding submission was sent to NTN. The submission requested a full implementation, however, NTN only released $20,000 for a scoping study as a first phase of the process.

This project has the primary goal of developing a framework for information and knowledge management within Local Councils. Phase 1 of this project has involved the preparation of this scoping report. Phase 2 will be to provide practical frameworks, tools and concrete examples of the benefits of information and knowledge management to assist councils with implementation. Phase 2 is dependent on the outputs of Phase 1 being regarded as sufficiently important to improve business practice within councils that a practical implementation is warranted.

This report provides:

- a needs analysis for information and knowledge management strategies amongst Australian local government;
- a 'best of type' knowledge management framework;
- evaluates the knowledge management business case for local councils; and
- an implementation strategy for knowledge management in Australian local councils.

What is the issue with information and knowledge?

For some time the concept of "knowledge management" has been viewed with some scepticism due to the difficulty in defining what knowledge is and the somewhat arbitrary manner in which various definitions have been proposed. Various consultant firms have been quick to indicate they have the correct definition and (usually), an electronic system to deal with knowledge management. The term "information

management" is a more familiar term with many organisations being aware of the need to organise information in a structured manner to assist them in achieving their business objectives and providing high levels of customer service. Most councils have some kind of records management system, have clear lines of communication of information at the front counter and are able to collect and present information to citizens in a cohesive manner through publications and local newspapers. As these examples demonstrate, councils already have information management practices in place.

Councils have knowledge management practices in place, although they are often not as visible as information management practices but are no less important and do exist. In fact, for a small council no better example exists than when the Customer Service Manager/Supervisor leaves Council and many of the intangible aspects of her role have not been documented. There are information systems in place that allow rate payments to be reconciled, permits to be received and processed and development applications to quickly pass through the lodgement phase and into the Planning section for assessment. What however is not recorded is how all these systems are synchronised (like the tuning of a car) to ensure the face of the council presented to the public is a cohesive one.

Knowing the time of year when most ratepayers who are late with rate payments eventually pay their bills enables extra staff to be scheduled to process payments swiftly. Being aware that XYZ Building Company always forget to add their ABN to the top of their planning applications and that front counter staff have to ask for it when a representative comes to the counter, saves time for the company rather than having to re-lodge the application 5 days after it enters the Planning Division if it is not checked at lodgement. Understanding that the re-zoning of a particular area affects the weed strategy, rubbish collection, building inspector contacts and payments for permits in that area enables the council to present all the accurate information to a customer enquiring about embarking upon an activity in that area.

All this is not recorded necessarily in a paper or electronic system. It may be the Manager/Supervisor's head. Clearly the council placed a value on this information and it had been seen as vital knowledge required for the efficient operation of the council's front counter. The effect of the loss of this key person is likely to create difficulties and provide less than optimal customer service. There is a need to identify and value information and use it to create knowledge management that weaves this together to create a better outcome.

What this scoping study attempts to do is gain an understanding of information and knowledge management and how it may apply to councils. Progress in this area by leading councils is presented and a case made for how this can be best applied to assist councils. Moving to providing council services and information via the Internet (delivering "on-line") affords councils the opportunity to examine their current information and knowledge practices. Poor practices will most likely result in the poor presentation of information about council services and operations in the online environment. Within the space of 10-20 seconds, an enthusiastic consumer of council services online can receive a negative experience and be lost to this channel of service delivery forever.

People who present themselves at the front counter of councils are often more patient as they have invested the time and effort to attend the physical location. Research shows that online consumers are less forgiving. They have experienced websites run by financial institutions, news broadcasters and travel companies which are exceptionally well designed and provide high levels of positive customer experience. They expect the same from providers of government services. Presenting information in a manner that replicates internal council practices based on internal "silos" will not work. Clearly information presented in cyberspace needs to be done so in the best way possible with the highest emphasis on the customer experience and not ease of process for internal council processing. This report attempts to lay the groundwork for the case to be made for use of information and knowledge management and some of the ways in which this can be tackled. This helps the internal organisation (business units) to be structured in information flows to enable the external interface (council website) to present a complete and positive experience to the customer.

Critical success factors

This scoping report has identified a number of Critical Success Factors (CSFs) for the implementation of information and knowledge management within local government. These include:

- Management buy-in
- Addressing data integration across and between local councils
- Change management issues in IM/KM implementation
- Dissemination of the benefits of IM/KM including case-study examples

Implementation Strategy

This report concludes with an implementation strategy for Phase 2. The strategy proposes three projects to be undertaken in the area of IM/KM as well as suggesting the appropriate organisation to oversight the projects.

It is recommended that

Three projects be undertaken covering

- An Education and Awareness program;
- The Development of a Business Case of Benefits of IM/KM for Councils; and
- A Toolkit for Councils covering IM/KM be constructed

and

that the projects be oversighted and integrated in to the Local Government Interoperability Framework project currently underway by the Australian Local Government Association.

2. Research and Models

2.1 Approach

The 'Local Government National Information and Knowledge Management Project' has the primary goal of developing a framework for the implementation of information and knowledge management within Australian local councils. Phase 1 of this project has involved the preparation of this scoping report. This report provides a needs analysis for information and knowledge management strategies amongst Australian local government; presents a 'best of type' knowledge management framework; evaluates the knowledge management business case for local councils; and, provides an implementation strategy for knowledge management in Australian local councils.

In scoping the requirements and implementation plan for the information and knowledge management framework for local councils this report provides details of the literature-based and applied research undertaken. This has included extensive telephone and face-to-face interviews and focus groups with technology and systems managers from a cross-section of local government authorities throughout Australia. This data collection involved collecting, analysing and evaluating views, perspectives and experiences of local government culture, change management, data and information resource management, knowledge management, systems integration and current information systems strategies 'in use'.

2.2 Definition

> "Knowledge management…embodies organisational processes that seek synergistic combination of data and information processing capacity of information technologies and the creative and innovative capacity of human beings."[1]

Within the last decade, the area of knowledge management (KM) has generated considerable interest in academic, business and public sector communities. KM has become the focal point of debates on mechanisms for increasing organizational efficiency, effectiveness and innovation. At the broadest level, numerous writers have argued that in the post-industrial information economy, natural resources, capital and labour are being replaced by knowledge as the basic resource from which socio-economic wealth will be generated.[2] In this context, the importance of public and private sector organisations being able to capture, use and leverage data, information and knowledge to achieve organisational objectives appears self-evident.

Of course, at one level it can be argued that this has always been the case. Successful organisations have always been those that can adapt, create and apply new information or ideas. Indeed, most of the concepts that KM draws on, for example, organisational

[1] Malhorta (2000)
[2] Drucker (1995)

memory[3] or the learning organisation[4] are not new. So why the new and growing interest in KM? A key factor has been the diffusion of information and communication technologies that can support knowledge-based activities.[5] More than this however, has been the recognition that in an increasingly complex and uncertain global business environment it is the creation and application of 'knowledge' (not just data and information) that enables organizations to rapidly and innovatively adapt to changing circumstances. These factors combined have contributed to a move towards more dynamic and organic models of organisations and away from mechanistic ones.

Significantly, while much discussion of knowledge management has centred around IT infrastructures and software applications, there is now a growing awareness that people and their skills, experience and creativity are at the core of successful knowledge management implementations. This perspective has been articulately expressed by Tom Stewart 'some companies think they can put all corporate knowledge on one huge server, a giant hyperlinked encyclopedia. It simply can't be done. The real value of information systems is connecting people to people, so they can share what expertise and knowledge they have at the moment, given that the cutting edge is always changing'.[6]

Defining Knowledge

Perhaps surprisingly, despite widespread agreement on the value and importance of knowledge, there remains little agreement over how to define it. Variously it has described as information for action; information combined with experience; deeper richer information.[7] Others have approached knowledge as a part of a semiotic continuum from the physical world of signals through meanings and intentions to beliefs and expectations.[8] While knowledge remains difficult to define, more recently there has emerged a degree of consensus on the fact that it can be classified as either explicit or tacit.[9] A third classification of implicit knowledge has been explored and is defined as 'the capacity to act' (conscious or unconscious) but acknowledges that this capacity only emerges in the dynamic context of actions.[10]

Explicit Knowledge can be codified, expressed in words and numbers and shared in the form of data, specifications etc. Explicit knowledge as embodied in data and information is well suited to the capabilities of information and communication technologies to collect, store, retrieve and distribute it. Tacit knowledge is intangible, personal and difficult to formalise or codify. Tacit knowledge is hard to communicate and share with others and tends to be intimately linked to individual's skills, experience, values and beliefs.

The creation of knowledge as a process of interactions between explicit and tacit knowledge has been modelled in an organisational setting, which led to 'a spiraling

[3] Huber (1991)
[4] Senge (1990)
[5] Davenport et al (1996); Sviokla, (1996)
[6] Stewart (2000)
[7] Land et al (2001)
[8] Stamper (1998)
[9] Nonaka, 1994; Nonaka & Takeuchi, 1995
[10] Karl Sveiby (2000)

process of interactions between explicit and tacit knowledge'.[11] The SECI model developed highlights four knowledge conversion processes: Socialisation; Externalisation; Combination; Internalisation. Interestingly, while there is a degree of agreement on this classification[12] and model of knowledge creation, there remain differing views as to which types of knowledge are most useful. For some a focus has been explicit codified knowledge and the importance of leveraging IT infrastructure and applications to deliver benefits. There remains however little detailed evidence of how exactly successful interaction should or does take place between people in the organization and these knowledge repositories. Others emphasize the importance of tacit knowledge in organizational settings. This has given rise to a growing awareness of the fact that much of the knowledge required in organizations is not in databases but in the heads of individuals. It is also acknowledged that the nature of organizational culture directly influences the extent to which this tacit knowledge becomes 'socialised' and shared within the organization. Again, however, there is little detailed evidence on the processes by which tacit knowledge is or should be shared. Finally, it is also important to be aware that context has the capacity to change the value of knowledge whether tacit or explicit. Effective knowledge management may rely on storing contextual information along with created knowledge.[13]

Inevitably, while there is merit in all of these perspectives on knowledge management, they all tend to provide only a partial view of what is a multi-dimensional and complex topic. What they do highlight is that knowledge management as an approach to generating best practice in creating, storing and deploying knowledge at individual and organisational levels is a desirable and worth-while project. KM emerges as being not just about doing old things in new ways but moving forward to find new things and new and better ways to do them. Managing knowledge can no longer be viewed simply as the codification of knowledge or the creation of a good IT infrastructure, but emerges as a process facilitating shared spaces for knowledge creation, exchange and utilisation.[14] These shared spaces may be physical meeting places, access to forums where points of view may be contributed and considered, shared document databases such as those found in the Lotus Notes model, places where ideas can be shared and innovation encouraged.

Data and Information Resource Management

In this context, it is important to locate these new discussions on knowledge management within the more conventional activities of Data and Information Resource Management (DRM and IRM respectively). It is now commonplace for organisations as they grow and mature to recognise the importance of data and information as a real corporate asset, similar to financial assets. (Data Management Assoc. Chicago). In managing this asset most organisations appreciate that some form of back-up mechanism is required to ensure that data/information is not to be lost. Most often database administrators are charged with this and other responsibilities including data integrity issues such as data redundancy and data accuracy. More recently, as the sophistication of organisational information systems has increased DRM and IRM

[11] Nonaka et al (1998)
[12] Nonaka et al (1998)
[13] Alavi & Leidner (2001)
[14] Schrage (2002)

activities have begun to address questions over information standards. Clearly, it is at the juncture between the value of data and the responsibilities of storing and using it that the requirement for appropriate Data and Information Resource Management strategies emerge.

Historically, organisations both large and small have installed a variety of products designed to meet their information collection, storage and retrieval needs for traditional records management. However, the relative immaturity of the software industry has meant that often these systems either quickly become unsupported or faced on-going problems integrating with the rapidly changing technical environment. As a result it was recognised that successive systems developed independently were prohibitively expensive to integrate and posed too many challenges for adequately addressing data redundancy and formats changes. In this context, the first step in addressing these issues is the approach adopted by numerous organisations of implementing standards with respect to data collection, storage and dissemination. To do this often existing systems need to be modified or replaced in-line with data management policies. It is at this point that decisions have to be made regarding the number, size and complexity of systems.

Large integrated systems such as SAP, JD Edwards and People-soft that are designed to manage many organisational functions can be slow and expensive to install. Organisations become heavily dependent upon these very large systems and can be exposed to considerable risk in terms of the cost of maintenance and upgrades. The return on investment for capturing and storing information is often not fully realised if the information cannot be accessed in a format that meets the information management needs of the organisation. Any other products that are purchased will be expected to import data from and export data to these major systems. This in turn makes these peripheral systems more expensive.

The alternative approach of modifying and replacing smaller systems to ensure that they can share data may not be achievable and may work out to be equally as expensive and slow to implement. As a case study, Inverell Shire Council (NSW) has adopted this alternative approach and has reported a degree of success in the implementation of Lotus Notes as a presentation product that is able to reference existing data.

Whichever approach is taken the key to successful data management is flexibility. A product that stores data in a proprietary format, allowing access only from that product, is not flexible. It is of paramount importance that data is stored in an accessible database such as SQL Server, Oracle or Sybase Adaptive Server and that the data models implemented are documented. Tools can then be provided to ensure the integrity of the data, adhoc queries may be made, and products can be built to read the available information.

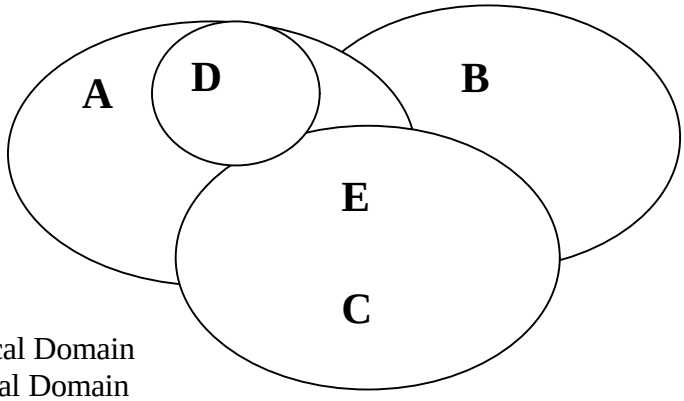
2.3 Data Resource Management and Information Resource Management In Councils

Research undertaken for this report indicates that councils hold large volumes of data pertaining to citizens and that the responsibilities of storing and referencing that data are significant. It is also evident that all the representatives of the councils contacted as part

of this research are well aware of this and are interested in ways of improving their data management strategies and techniques. In particular, a common goal amongst a majority of local councils contacted was to implement and/or enhance their use of integrated data resources. It is evident that many, if not most councils have arrived at a position where they have a number of 'legacy' systems where growing redundancy is a problem and moving toward a more integrated approach is desired. All councils contacted also appear conscious of the principles of good data management but many remain wary of 'Knowledge Management' per se. Indeed KM is viewed by many as a longer-term goal with attendant costs that they would like to address after further refining their DRM / IRM strategies. Most councils contacted were also aware of the need for change management strategies to be implemented in parallel with data / information management strategies. Indeed, almost without exception, information managers from local government were adamant that dealing with change was the most important issue.

Figure 1. below provides a graphical representation of the constituent elements of, and relationship between discourses on Knowledge Management (E) and on DRM /IRM (D). It aims to highlight that where DRM / IRM are very much within the Technological domain, Knowledge management also involves detailed awareness of the organisational and psychological domains to address the ways in which individuals and organisations in specific contexts can be connected to share and creatively generate new ideas, concepts and things.

Figure 1. Representation of the relationship between KM and IRM / DRM



A – Technological Domain
B – Psychological Domain
C – Organisational Domain
D – IRM and DRM
E – Knowledge Management

2.4 Knowledge Management Implementation Issues

In any organisation the implementation of Knowledge Management operates in the context of power relations. Therefore it is important to temper enthusiasm for knowledge management practices with recognition of the context of most organisational circumstances where inequalities in power meter the ability of individuals to act. In this

sense then relationships are a central aspect of the implementation of successful knowledge management. "The real problem isn't that people don't have access to information. The problem is that once they have information they can't influence anybody. That's the bottleneck. The bottleneck isn't information or data. There are exceptions to this. But, in general, if you're trying to persuade somebody to act, you don't have a knowledge management problem--you have a relationships problem."[15]

Knowledge management is entwined with the management of human resources, in support of which is the adage "people are our most important asset". Since people are inseparable from the management of knowledge resources, the contribution they make and the roles they fulfil ought be understood and valued accordingly.

2.5 Councils and Knowledge Management

In the context of the above discussion, before local councils move down the route to implementing KM strategies they need to have a clear understanding of how to introduce it in a way that positively contributes to both their business objectives and the expectations of their local communities. KM has the capacity to increase council efficiency and effectiveness and to provide them with flexibility and the capacity to respond rapidly to changing circumstances. Critically councils will need to understand the technical and organisational process issues involved in developing and incrementally implementing a KM strategy.

This scoping report will identify options for managing knowledge within and between local councils. It will provide a comprehensive framework that enables individual councils to identify the 'best strategy' for them to move forward with KM. The report will also develop an implementation plan for phase 2.

The remainder of this report is focused around four major areas:

- Application of the KM Framework to Local Councils
- Evaluation of the KM Business Case for Local Councils
- Knowledge Management and Online Service delivery
- Implementation Strategy for Phase 2 of the KM project.

Suggested reading

Before proceeding with the upcoming sections of the report it is suggested that the reader familiarises themselves with the framework outlined in Appendix 1: Developing a Knowledge Management Framework: Approaches, Tools and Techniques. This framework, whilst being theoretical in nature does have practical elements that relate to Councils. Any attempt to introduce IM/KM requires a solid foundation upon which to base itself. The approach outlined provides a link between KM and business benefits as it brings in processes, workflows and decision support mechanisms that can be identified and utilised by Councils.

[15] Schrage (2002)

3. Application of the KM Framework to the local government environment

Based on applied research with local councils a number of common themes have emerged that have implications for the development and deployment of the Knowledge Management framework listed in Appendix 1. This applied research has been conducted with information technology and systems managers from a cross-section of local government authorities throughout Australia.

From the research it has emerged that most councils provide between 70 and 90 separate services to their communities. This provides a strong argument for having a strategy for information and knowledge management as the best mechanism to ensure the efficient and effective delivery of these services by council.

The section below highlights common themes that emerged during data collection and links them to specific local council situations.

3.1 Case Studies

Within Tasmania the Hobart City Council (Tas) observed that policies about data retention are very important but remain conspicuous by their absence. Changing information systems often means that historical data is lost or left in a state that makes it very difficult or impossible to reconstruct. It is evident that any information and knowledge management strategy must take account of this.

Costs associated with the maintenance of new information systems are seen as a potential drain of local council resources. Hobart City Council sees a necessity for staff to monitor several parts of an online system on a permanent basis i.e. (systems admin, security logs, forms and data received, transfers from behind firewalls).

Launceston City Council (Tas) have a large amount of data in a variety of 'systems'. This lack of data integration and data compatibility makes it hard to publish. They are very wary of duplicating effort for any sector wide initiatives where sharing of information may involve one council bearing the cost of its development. However they supported the idea of unified approach and viewed it as critical to the acceptance and ultimate success of any IM & KM strategy.

Burnie City Council (Tas) use two major systems; RedDot for document control, which they have found is well suited to publishing web documents, and Fujitsu 2000+ for accounting etc. From their experience Burnie City Council believe that they are meeting the challenges of information management and publication, or at least, have most of the tools, management support and knowledge to achieve this within short time frames.

Representatives from the Municipal Association of Victoria (MAV) identified data management challenges; paper records to be transferred to e-records, issues of meta data and meta-data standards. It was also noted that culturally there was no tradition of

information sharing between councils. It was also noted that there was little or not KM policies or strategies per se that had been documented. Integration of data and data integrity also emerged as a central issue and there was strong agreement staff information, knowledge, experience and commitment were more important than technology and tools.

Wangarattta Rural City Council (Vic) reported a large number of information systems including customer requests, an information index, version control, Team info management (TIM), GIS, website, Lotus Notes but acknowledged that as yet it had not developed a unified KM policy or strategy. There were however numerous procedures in place to deal with some of these specific information systems.

Greater Geelong City Council (Vic) reported that they have a full time Oracle Database Administrator, and observed that most of their software requires an upgrade annually which has to be installed and tested at significant cost each year. They would welcome being able to rectify this situation and thereby dramatically reduce their costs.

Maroondah City Council (Vic) illustrated the culture of not sharing information in relation to the staff who cut the grass on the local oval – these staff will not publish any sort of schedule in case they cannot keep to it and people complain. As a result local residents only find out when it actually happens.

In addition to data management issues such as resources for maintenance, avoiding duplication of effort and streamlining processes and systems, it would appear that the sort of knowledge pertaining to Local Government that is not always readily available, and may be lost, is of the more abstract type particularly with regard to relationships, some examples from data collected from other local councils include

- Knowledge about regular customers such as property developers, knowledge of the types of development that they prefer for financial or other reasons;
- Negotiation skills based upon experience of the strategies employed by developers and the outcomes that they favour;
- Mediation skills relating to disputes between neighbours, requiring knowledge of the sorts of activity that lead to disputes and the rules, regulations and commonly accepted agreements that lead to the resolution of these disputes;
- Knowledge relating to Aldermen, their allegiances, beliefs and preferences;
- Political knowledge with regard to other authorities and public figures;
- Knowledge of the balance that needs to be maintained between statutory and service obligations; The rules and regulations that are to be observed and the service to the community that is expected;
- Knowledge of the structure of Local Government and the administrative processes that maintain it such as the process for appointment and promotion of staff;
- Knowledge of the motivators for staff and consequently the quality of service that they provide; and
- Knowledge of the context in which Local Government operates, key roles and responsibilities.

In the context of the above issues and as an approach to identifying a process to move forward a series of themes were identified. The first of these being that councils are

enabled to be able to assess their existing approaches to KM and their existing knowledge assets.

3.2 Issues worthy of consideration

Local councils need to know how knowledge can be measured

European companies have taken the lead in developing measurement systems for their intangible assets and reporting the results publicly and include:

- Skandia AFS, a subsidiary of the Skandia insurance and financial services company;
- WM-data, a computer software and consulting company;
- Celemi, a company that develops and sells creative training tools; and
- PLS-Consult, a management consulting firm.

All of the companies listed here are Scandinavian companies - the first three being Swedish and the fourth being Danish. They have all been influenced by the pioneering work of Karl-Erik Sveiby of Sweden, who developed a method of accounting for intangible assets in companies in the late 1980s.[16]

Whilst not seeking to imply that Councils are the same as Scandinavian companies, the one area they do have in common is recognising and measuring intangible assets. Councils deal with many intangibles from political alliances, contact people within the local municipal area through to the implementation of local practices and policies much of which is not currently recorded on any media. The loss of key personnel through retirement, resignation or illness can leave local government organisations exposed and having to expend significant resources to provide continuity of process enjoyed previously. The implementation strategy will provide techniques that local councils can apply to know what constitutes knowledge and how it may be measured.

Local Councils need to remain aware of the Contexts in which they operate

It is important to recognise that local government operates in two distinct and nearly opposing modes. Firstly it operates to serve the community under the direction of its elected representatives. Secondly it operates in a legislative and prescriptive mode as it implements laws and regulations designed to protect the individual and the community. So the Local council acts to help its customers in any manner that it can and it also acts to prevent its customers from behaving outside of the limits defined in a vast number of regulations. The local council is then both a 'social facilitator' and 'policeman'. Partly as a result of this, its staff may have many masters;

- Two tiers of government above local government;
- Elected representatives at the Local government level;
- Clients composed of large and small businesses; and
- Very large number of property owners.

Local Councils and awareness of Community Perceptions

Perceptions emerge as being critical, indeed some organisations are driven by how they are perceived by their clients. Hence the proliferation of customer satisfaction surveys, staff perception surveys. It may be necessary to conduct such a survey or critically

[16] Nonaka & Takeuchi (1998)

evaluate any existing surveys in order to determine the way in which Local Government is viewed. If there are misgivings in the community regarding the quality and/or timeliness of Local councils information then these need to be addressed in terms of actual and perceived performance.

Local Councils and creating the right Organisational Culture

If it is accepted that KM has a strong philosophical and cultural component then these may be the philosophical issues. On the basis of the meeting with MAV it is clear that there is not a mature culture of sharing information or embracing new systems, and that changes in this area are likely to happen slowly. It may be useful to demonstrate the benefits to individuals and to the organisation of adopting a sharing attitude to knowledge. Such a demonstration may take the form of showing the disfunctionality of not sharing knowledge. No backup, dissatisfied customers, costly mistakes etc.

Physical Environment: Number of staff

How many people need to be involved in a given process and do they understand each other and do they present a united view and consistent advice?

Offices and equipment and other Resources

This is largely an unknown factor but it is clearly extremely relevant in terms of providing environments conducive to an integrated IM & KM strategy.

Technical Environment

Based on meetings with LGAT and MAV members, it appears that the bigger councils have in the order of 5-10 software systems to manage their affairs. Generally, it would appear that these systems are not well linked or cross-referenced except where additional systems are layered across them. The technical environments seem costly and unnecessarily convoluted. The responsibility for managing computer systems and the data held therein is not always well defined. All participants interviewed were wary of additional systems that might require additional resources to install and maintain. The diverse nature of local government systems environment is an issue that should be addressed in the implementation strategy and needs to be tackled on a sector wide basis.

Individual Council issues

It is at this level that the sophistication will be needed to be choose the implementation approach for KM or any other sort of information systems management strategy. It will almost certainly be appropriate to develop a range of solutions that can easily be extended and adapted to the context of councils of different sizes and different levels of resourcing. It seems probable that it will be easier to find and fund solutions for smaller councils than for the larger ones that already have extensive systems in place. A hierarchy of issues to address and the generation of matching documentation /software templates may be considered:

4. The KM Business Case for Councils

The applied research highlights 2 main challenges for the KM delivery framework in the current local government environment:

- Technical - information management issues revolving around problems of information silos; information flows/processes; limited integration; challenges of interoperability both within and between sites; and
- Cultural/organisational - the change management issues around identifying the value of knowledge; senior management 'buy-in'; over-coming territorial behaviour and communication difficulties; short-termism; ensuring an external customer focus.

4.1 Critical Success Factors

Two success factors in this section for Councils are:

- Recognition of the value propositions: savings in time; money and other resources – improvements in customer service delivery, greater efficiency and improvement in staff skills; KM approach will also bring **sector-wide** initiatives and feed into continuous improvement and business excellence (BEF/BAP)
- Recognition of the costs of non-implementation of KM:
  including legal actions arising from erroneous/inappropriate information provision which need to be covered in Risk Management processes

4.2 Other factors requiring consideration

- Risk analysis;
- Benefits, Tangible and not so tangible;
- Customer/ Public satisfaction;
- Safer environment;
- Accurate and timely information;
- Provision of useful information;
- Staff satisfaction;
- Higher public regard;
- Job satisfaction;
- More interesting/ less repetitive;
- Increased career opportunities; and
- Efficiency improvements – Better Service and /or less cost.

4.3 Perspectives and further Case studies

There are a number of initiatives being taken up amongst councils throughout Australia in the KM. Some relevant examples include the following:

Darebin City Council (Vic) have already started conducting a Knowledge & Information audit as a first step in the development of a KM strategy. The approach involves the use of a survey of the organisation and the use of focus groups to derive benchmarks for this audit. Already it has emerged that management of cultural change issues will be of prime importance to a successful implementation of their KM strategy.

There is also a recognition of the problem of data management occurring without the provision of any contextual information and the belief that an additional staff member will be required to ensure data integrity. Darebin have received high- level management support for their KM strategy and have a Project Manager focused on KM.

Greater Dandenong Council (Vic) have begun deploying handheld devices in the field for data collection and they preparing paper records for conversion into e-records. The Council have a website, metadata store, an asset management system, customer request system and a classification system for records management.

Moorabool Shire (Vic) near Geelong have surveyed to discover that only 7% of emails make it to corporate repositories. Moorabool Shire is in the catchment for Geelong and so the two councils have many shared concerns and responsibilities and they are beginning to see data sharing opportunities. Geelong use the 'SMEK' system for pavement management. This system predicts degradation and maintenance requirements and is also used to record and managed information about trees, signs and pits. Interestingly with regards to records management, uncertainty about how long to keep records remains.

Hawkesbury City Council (NSW) has the largest area of all the Sydney metropolitan councils and uses 'Technology 1' for Finance, Property and Rates, Payroll. Records and Document management with correspondence captured using 'Dataworks'. Currently KM is not seen as a priority strategy that will deliver tangible benefits over costs.

Lismore City Council (NSW) indicated that other Councils in the regions had the same sorts of systems as each other which does afford the opportunity for synergies to be developed in the information management area.

Brisbane City Council (QLD) have a system that gives staff at their call centre immediate access to all facets of council operations including Health, City assets, Building approvals and inspections, Rates, Fines, Dog enquiries etc. The Call centre aims to answer 80% of questions within 20 seconds.

Alice Springs Town Council (NT) have used 'Civica Authority' for five years. This system as installed is used for rates, licences, financials, customer requests, contracts. The environmental health department of the Alice Springs council use 'Open Office' to record data such as pool sanitation, kitchen inspections, mosquito control. Their web site has a high tourist and visitor information content partly due to the strong contingent of US citizens who come to work at Pine Gap on three-year contracts. They are implementing Civica web content manager and are aiming to improve customer service as part of an overall strategic plan.

Port Phillip City Council (Vic) has EDMS, rate payer information, property data and an application system for planning, building, subdivision, Licensing, Health, Animal Management, Customer Request, GIS, and financial management systems. These are integrated so that access across these systems is possible. Web enablement of some content is viewed as a part of the council strategy. In the early stages of development is a new Asset Management system which will also integrate with other Council systems

and data. It was noted that maintaining integrity of data remains a challenge due to the rate of change.

4.4 Measuring Local Councils current situation

An assessment of councils' current situation with respect to Data and Information management may be a desirable goal. To this end, there are a number of modelling tools that may be considered. John Zachman's succinct view on Enterprise Architecture[17] is that there is an inevitable trade-off between short term and long-term solutions, specifically between implementation and integration.

Zachman maintains, with considerable recognition and support, that "the 'Framework for Enterprise Architecture' (the 'Zachman Framework' – Appendix 2) is a useful analytical tool to assist thinking about this trade-off, to correctly set expectations and to devise strategies to mitigate the effects of these short or long term choices."

The Zachman Framework is presented as a universal and comprehensive modelling tool. In order to be comprehensive, it incorporates the six primitive interrogatives (what, how, where, who, when, why) and cross tabulates these against five levels of abstraction ranging from the Planner's viewpoint, the conceptual model, logical model, physical model and finally a detailed representation/implementation. Zachman's framework is included as Appendix 2.

Perhaps the most compelling argument for the derivation and application of an enterprise architecture is to consider how change might be managed in the absence of such a model. Is it prudent to change anything without an understanding of how it works and what it was designed to do? It must be recognised that the operation of local government authorities is far more complicated than the data that it collects and uses. Beyond the raw data lies the information that the data is expected to represent and beyond this is the way in which information is shared, published, presented, owned and understood. Information systems necessarily include social and management issues. A comprehensive and accurate Zachman's style of Enterprise architecture may be so extensive and complicated as to be unmanageable in itself.

Detailed, whole of enterprise modelling exercises may consume themselves before they return any worthwhile benefits. However, it may be beneficial to examine some of the components, first of all in isolation, and then in terms of important relationships with other components. The implementation level of the Zachman framework applied to raw data may provide a data map that enables problems of redundancy and incompatibility to be addressed. For Councils, initiatives involving implementation of Enterprise Architectures are probably best achieved in conjunction with State governments where appropriate linkages and access to expert resources can be levered.

4.5 Innovation & Creation

Creation of shared spaces that make the meaningful exchange of ideas more likely will be an important aspect of any KM strategy. Such a shared space can be a physical

[17] Data Management Association, 2002

location where ideas can be shared, prototypes and demonstrations viewed or it can be an on-line or virtual shared space such as the Lotus Notes example of shared documents resident in shared databases or an intranet with all staff having the opportunity to contribute.

Information pertaining to the physical or virtual environments in Local councils needs to be gathered. An important part of this is discovering the attitude of senior management to the idea of shared spaces.

4.6 KM Developmental Issues

We should determine the status of local councils as learning organisations - Is there a culture of learning? What opportunities are there, what is the attitude of management and what can be offered from the KM spectrum. If any generalised solutions are to be offered, then appropriate training must be provided.

4.7 KM Process change Issues

How is workflow managed? Is there a case for implementing a workflow monitor in software for any of the identified classes of Local councils? How is quality ensured? Documentation templates can be derived and the Local councils can complete the details of precisely how and where organisational quality is managed. Are roles and responsibilities clearly documented, referenced, supported and understood? Are organisational processes similarly documented and followed?

How are customer interactions recorded? Customer relationships should be documented, not handled arbitrarily and without records being made. A simple customer relationship system could be developed for use by any size of Local councils. What information should be published by Local Government Associations and exactly how does this happen?

4.8 Asset Management

Once again, it is not known what level of sophistication has been attained by the various Local councils, it is anticipated that some form of asset register is maintained. There would be benefits associated with using a standardised software register across the sector.

The data model for this would be straightforward and would principally revolve around three objects as a starting point for an integrated system:

- Property (Property id, Address, Map_Ref, Name, Details)
- Enquiry(Name, Property id, Address, Date, Officer, Type, Details)
- Asset(Asset_id, Location, Map_Ref, Description, Value, Date_of_val)

4.9 Analytical Issues

Is council data in a standard database and can it be queried conveniently (does data have map refs?) What support is there for decision-making and are decisions

documented and readily available? Is there a case for a Decision Support System and more importantly would it be accepted and used?

5. Knowledge Management and Online Service Delivery

This document makes it very clear that there is a case for greater levels of consistency in information management principles by Councils as well as an opportunity to branch into the foray of knowledge management. The Councils contacted as part of this study have indicated that they are starting to operate in this realm and consider the advantageous to be gained from examining how to deal with knowledge within their organisations.

Through the Networking the Nation program, all States and Territories have received grant funding to move their local governments into the online environment. This is occurring at various levels with some Local Government Associations focused on the delivery of physical infrastructure and web presences for Councils through to others whose emphasis is on standards and the delivery of online transactions. However within the Government Online journey all these positions can be accommodated. There is a great deal of cooperation between the jurisdictions and the Australian Local Government Association (ALGA) has set up an online repository (STATIS) to enable sharing of outputs to occur in an efficient and effective manner.

Delivery of service online is different from normal service channels

For many Councils, the online environment represents a fundamentally different service channel than those previously offered to citizens. This environment gives a 24-hour-a-day, 7-days-a-week presence that was previously not possible. Issues of privacy, security and authentication are also emerging for this service delivery channel. Councils need to be careful about what is published on their websites as definitive advice must be couched in terms that protect the Council from legal redress as well as can be easily understood by the citizen.

Poor information and knowledge management practices will lead to undesirable outcomes for citizens

To achieve this however, administrators must be able to manage the information and knowledge within their organisations effectively. Poor management practices around data and information will lead to inaccurate, misleading, conflicting and out-of-date content being published to websites. These in turn leads to decreased consumer confidence in information being accessed as well as lower repeat visits to websites. It can also lead to confusion and frustration and more rather than less, dealings with the Council to sort matters out. In a worse case scenario, arbitration may be necessary to resolve what the client perceives as being correct (when it was published) versus what is actual practice within Council.

Unless Councils can recognise what constitutes “core” knowledge, where it is located and who is responsible for it (and implement a management regime), all that will occur is that information held in silos will continue to be published on the Internet in a silo format. There will be a lack of integration in the information presented which will have a negative impact. For example, a Council that publishes information about Development Applications by listing components separately under Engineering Services, Planning Services and Administration headings runs the risk of having the applicant chasing information from these silos to generate a complete picture. The Council that recognises that knowledge about the Development Application process

requires an integration from these three areas, manages the relationship and publishes a Development Application Service Pack on the website with the components integrated, provides an enormous benefit to the applicant as well as to the Council Planner when a more accurate application is submitted.

The following example illustrates the issue further.

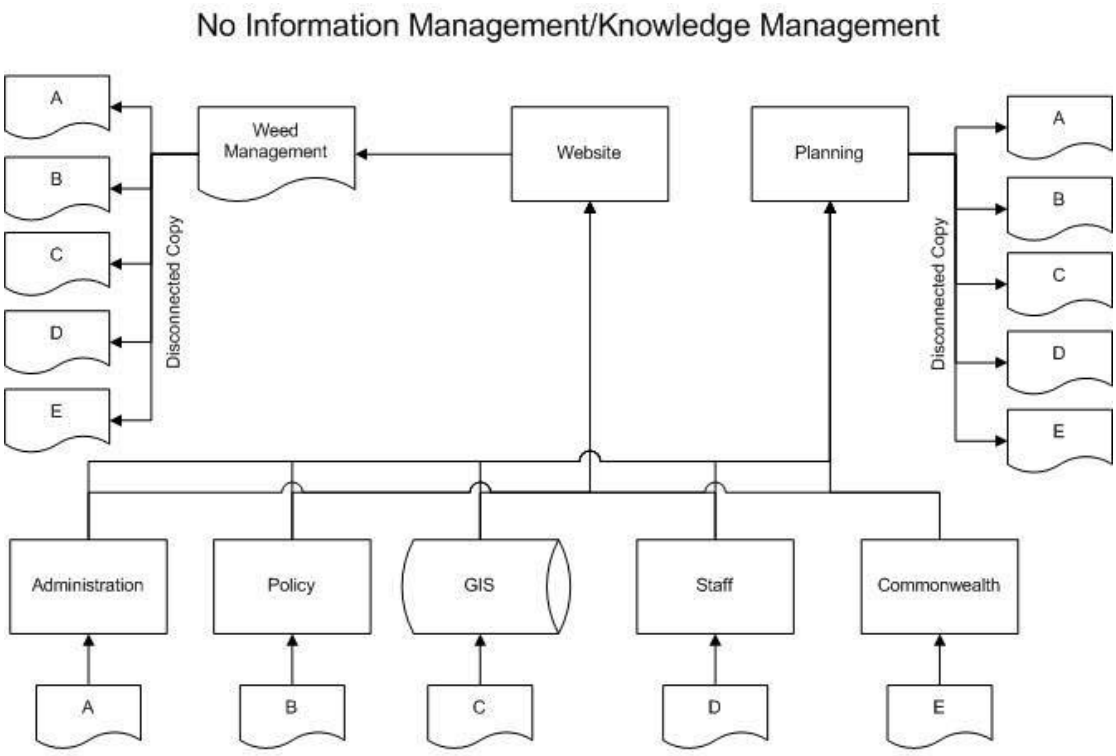


Figure 2. Weed Management with no connections

In this example, each of the Council sections listed at the bottom of the diagram have a specific piece of information in relation to weed management – A, B, C, D and E. Each piece of information is distinct but related to weed management. Copies of this information reside within the Planning section and with the environmental officer under Weed Management. Unfortunately, what is presented to the user on the website is various information about weed management from the different section areas. Planning presents a view about weed management in a particular zone to the public on the website.

Suppose an area changes from industrial to semi-industrial zoning - the Planning section only updates their copy of information about weeds as it relates to planning (if at all). From a Planning perspective, all that is required is that weeds are identified in any Development Application. However, the management of weeds by the Council in industrial and semi-industrial zones is different. It may well be that as an area has become re-zoned the administration charges surrounding Council embarking upon clearing of weeds changes. The contact staff involved also changes as industrial and semi-industrial zoned areas have different contacts and hours of operation. Without a

coordinated way of capturing this information, the public is unaware that the re-zoning affects weed management data presented via the web.

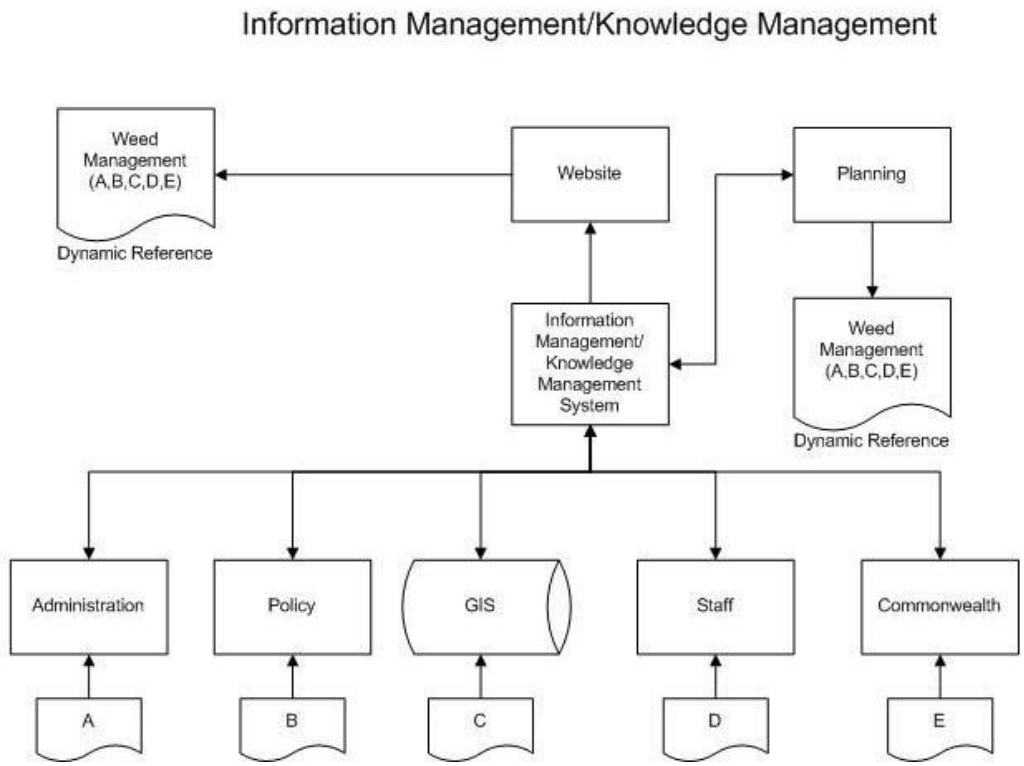


Figure 3 Weed Management with connections

Under this example, weed management has been identified as an area that integrates with a number of Council sections. Planning is aware that any changes they make can affect the other areas in respect of weed management. What is presented on the website is an integrated view of weed management. When the re-zoning occurs in this case, the IM/KM system is used to alert the other section areas within the Council that for this area, different charges for clearing of weeds and contacts may need to change on the website. The public is then presented with an integrated view and one that is accurate and aligns with the re-zoning change.

6. Conclusion

This paper has outlined the concepts of information and knowledge management and presented international research on the topic. A framework has been suggested that has possible application to the local government sector. What is also evident is through the contacts and discussions with leading Councils that the implementation of information and knowledge management principles would assist with the daily operations of Councils, improve business processes and present better quality information to the public via the online environment.

Councils store, manipulate and output a great deal of data and information. Knowledge covering the manner in which this data and information is used to deliver Council services is built up over a number of year but often not recognised as knowledge, let alone captured and maintained. The rich variety of community interactions with Councils leads to great amounts of knowledge being created and accessed by staff seeking to provide excellent service. Quite often this resides within the heads of key individuals and intangible interactions are often under-appreciated for the impact they have in the smooth delivery of service.

This paper has sought to illustrate that there is a deficit in the manner in which Councils operate in the IM/KM environment however there is great potential to implement mechanisms at this point that seek to maximise the move into online services and integration of systems. The online environment is new – this brings possibilities and new initiatives often challenge existing practices. Effective IM/KM systems will enable accurate and appropriate information, content and service to be presented to the public with a higher-order emphasis on interactions (or knowledge) between elements. Information that is presented within a KM framework or focus will enable the public to be in a better position to make decisions rather than being presented with basic information that still requires the intervention of a third party (Council officers) to demonstrate connections.

Of course, this process will be a long-term journey. Leading Councils contacted for the purposes of this study are just embarking upon the process. Incremental steps are required. Consideration of the size of Councils (small, medium, large) and their geographical location (urban, semi-urban, rural, remote) will all need to be factored in throughout the implementation phase. Council resources are limited and systems or technology that enables implementation of IM/KM with minimal resourcing components are to be favoured.

Finally, this area of IM/KM for Councils is a fundamental element in the journey of eGovernment. Similar initiatives are already underway at a national level through the Australian Local Government Association (ALGA) such as the STATIS and Interoperability projects that seek to share resources and bring about agreed standards, practices and policies relevant to local government throughout Australia. There is tremendous potential to integrate the implementation strategy proposed underneath into these existing programs to effect an efficient management and delivery mechanism across the sector.

7. Implementation Strategy

7.1 The approach

In delivering an implementation strategy, this paper is mindful of the resource limitations that exist within Councils yet it does not seek to underestimate the importance of tackling IM and KM within Councils. This research has indicated that there is a place for some type of IM and KM within Councils and that some Councils are starting to make inroads in this area.

It would be easy to assume that the sector is not ready to tackle this area, however that denies the thrust of this research which indicates the time has come for Councils to move in this area. In particular, the move to provide online services and the need for information to be discovered across the three tiers of government make it essential for Councils to consider the introduction of IM/KM practices. It is a 'foundational element' on the road to eGovernment and not an afterthought.

Any implementation needs to be mindful of the sizes of Councils and the communities they serve. It will not be helpful to have a strategy that only targets the large scale Councils who are blessed with a wealth of resources. However some of the smaller Councils such as Darebin (Vic) has recognised the importance of IM/KM and are making inroads. Whilst some Councils will not be able to implement full IM/KM programs, they should still be able to access and understand the concepts as well as use a number of the tools suggested in this strategy.

7.2 Links to other initiatives underway

Any implementation strategy should complement programs already underway and not seek to replicate areas that have already produced benefits. The following are examples of where other initiatives are underway and can be levered for support:

Online Council
Research conducted for this paper indicated that in 22 May 1998, the Online Council approved a set of Information Management Principles for implementation by the Commonwealth. The principles stated were:
In support of consistent information management principles across Governments, the Online Council on 22 May 1998, agreed to the following principles and technical protocols for Online Resources:[18]

1. SUMMARY OF INFORMATION MANAGEMENT PRINCIPLES AND TECHNICAL STANDARDS AND PROTOCOLS FOR GOVERNMENTS TO COMPLY WITH IN SUPPORT OF SEAMLESS CROSS-JURISDICTIONAL

[18] http://www.egov.vic.gov.au/Research/WebSiteIssues/InformationManagement/infomgmt1.htm

ACCESS TO ONLINE RESOURCES

(a) Information Management Principles

1. Minimum information standards

- all information has a custodian
- all information has a publication date
- all information has a revision date.

2. Information must comply with the minimum content quality standards as specified in the **Search Engine Working Group Report**. These include the need for currency, completeness and comprehensiveness.

3. Any external resources referred to must be of a reasonable quality.

4. Any jurisdictional requirements regarding privacy must be observed.

5. Third party value adding must comply with minimum information standards.

6. Implement policies and practices that guarantee the integrity, security and authenticity of the information.

(b) Technical Standards and Protocols

- Use of local search engines that comply with the **Search Engine Working Group (SEWG)** functional specifications
- Compliance with communication protocols for the exchange of data in a networked environment such as: Z39.50; X500 and LDAP
- Use of standard storage formats such as: XML, SGML, HTML, PDF, gif, jpeg, tif and other formats suitable for downloading using FTP and other protocols.

2. THE ONLINE COUNCIL DID NOT AGREE TO THE FOLLOWING INFORMATION MANAGEMENT PRINCIPLES BUT INSTEAD SOUGHT ADVICE FROM THE INTER-JURISDICTIONAL WORKING GROUP ON THE SUITABILITY OF INFORMATION MANAGEMENT PRINCIPLES 7 TO 9, TAKING ACCOUNT PARTICULARLY OF IMPLEMTATION COSTS AND BENEFITS.

7.Compliance with the Australian Government Locator Service (AGLS) metadata standard (facilitated by the use of automated metadata generating tools embedded in records management systems or elsewhere).

8.Weekly site indexing of metadata.

9.Use of an all of governments functions thesaurus based on the **Keyword AAA thesaurus** (which will have a natural language concordance).

However investigations undertaken for this research were unable to uncover instances where these principles had been implemented other than used by MultiMedia Victoria in conjunction with other principles developed. Certainly the principles themselves could not be located on the National Office for the Information Economy (NOIE) website and the only reference found was buried within the MultiMedia Victoria

website. Whilst these exist, it appears unlikely they have been adopted to any great level by local government in Australia.

TIGERS IDEA Project

The Trials in Government Electronic Regional Services (TIGERS) project funded by the Commonwealth recently undertook Phase 1 of the Information Discovery Across Government project. The objective of this scoping phase was to examine the level of information discovery across the tiers of government with particular attention being paid to the local government sector. The findings indicated that there is not an overall coordinated approach to information discovery within the sector and that a great deal of effort is required to ensure that the sector becomes part of the interconnected government concept. The findings also indicated that the sector would benefit from some overall approach to IM and KM to assist with the discovery of Council information online.

ALGA's LGIF project

The Australian Local Government Association (ALGA) is undertaking the Local Government Interoperability Framework (LGIF) project on behalf of all Councils throughout Australia. This project seeks to create an Interoperability Framework for local government and includes an eGovernment strategy and Information Architecture for the sector. Its focus is to try and position the sector to be able to fully participate in the delivery of online services throughout Australia so that interconnected government can become a reality and a seamless face of government is presented to the consumer.

This project is seeking to draw together elements that each Local Government Association (LGA) is producing through their online projects funded under the Networking the Nation program. It is also undertaking a series of sub-projects with a national focus to draw together all the elements into a cohesive framework. The current Project Plan has identified the application of metadata and knowledge management as important aspects that the sector must consider.

It would appear that this project is a likely vehicle to drive the following projects suggested to move IM/KM forward for local government.

7.3 Potential Projects

Whilst there are only three projects proposed, the number does not diminish or underestimate the importance of each aspect to the issue of IM/KM for Councils. The three projects proposed form the beginning of the path for Councils to embark upon with IM/KM. Proposing sophisticated IM/KM projects at this point in time would only benefit half a dozen Councils at the most – the emphasis needs to be on assisting as many Councils as possible to understand the importance of IM/KM and make initial forays into this area. The research conducted for this paper indicates that most Councils are on the threshold of the introduction of IM/KM and that its integration into most areas of local government is not mature. However we need to remember that IM/KM is a fundamental element in the move towards the development of online services and the delivery of better processes to ultimately better serve customers. We need to start

somewhere and propose projects that will enable Councils to enter the continuum so that the sector as a whole embraces the IM/KM idiom rather than just a few Councils. When the sector takes up this challenge, tangible interactions between levels of government will start to occur.

7.3.1 Education and Awareness

Most projects operating in the online environment have some degree of education and awareness attached to them. The online projects funded under Networking the Nation and being undertaken by each LGA all have an Education and Awareness program attached to them. These programs are aimed at raising awareness of the issues surrounding online government and are directed at:

- citizens;
- businesses;
- Elected members;
- General managers of councils;
- senior staff within councils;
- GIS staff within Councils;
- IT staff within councils; and
- administrative staff within councils.

The ALGA LGIF project also includes an education program within its Project Plan, particularly given the issue of explaining the concept of interoperability and its relevance to Councils.

A key issue is that of getting Councils to understand the issues surrounding IM and KM and then having champions to take the message forward. Darebin (Vic) has already taken that step by creating a staff position whose focus is that of knowledge management. This takes commitment from the leaders within Council to see the management of information and knowledge as something worth undertaking. Any awareness and education program must be primarily pitched at senior management level to establish need and buy-in. Councils also respond to positive case studies from other Councils undertaking initiatives. That is why the following suggestions include using leading Councils operating in this area.

- Produce a video demonstrating Councils leading the way – this would include examples of Case-studies and scenarios of KM ‘champions’ as illustrations of the processes of KM framework implementation;
- Create Pamphlets demystifying IM/KM;
- Produce literature with simple messages indication what information is and what knowledge is in everyday terms; and
- Identify IM/KM regional ‘champions’ in every State and Territory and encourage them to take an active leadership role in encouraging other Councils to follow suite.

A key determinant of success is to use the LGAs in every State and Territory to promote and display this material at conferences, meeting of Mayors and other elected officials,

workshops with General Managers of Councils and occasions on which Councils meet together on a regional basis to discuss area of mutual interest.

Cost estimate: $10,000 to research and up to $40,000 to produce materials.

7.3.2 Development of a Business Case

For Councils to be positive about the implementation of IM and KM and to assign resources and value to the proposition within Councils, a Business Case needs to be developed. As a resource and tool this will be invaluable in enabling Councils to determine which aspects of IM and KM to implement and the relative costs and return on investment for their Councils. The business Case will be generic in nature and allow Councils to work through those areas that are best suited to them. They will also be geared towards providing cost-benefit analysis for KM strategies including identification of customer service benefit dividends (increasing priority on customer interface with councils).

As such this is a consultancy and the estimated cost is $20-$30,000 to produce the Business Case and trial with a few selected Councils

7.3.3 Toolkit for Councils

Arising from the Case studies and Framework presented in this report, there are tangible aspects of the Framework presented that can be worked into a series of templates and starter kits for Councils. These will need to be attuned to specific IM and KM issues in Councils of different sizes (large, medium and small) and in different geographical settings (urban and rural). These kits will provide a detailed checklist of approaches, procedures and strategies for KM implementation and evaluation. This will enable Council staff to work through items without the need for consultants to undertake a process thus saving money. It is suggested that the resources made available by MultiMedia Victoria be used to develop this material as a first part.

A suggested cost estimate is $20-$30,000 to produce the kits plus run trials in a few Councils

7.4 Recommendations

As noted above three projects are suggested to enable the issue of IM/KM to be tackled on a sector-wide basis. It is also important to identify a potential mechanism for the management and oversight of these projects. As the ALGA is embarking upon the LGIF project and IM/KM for Councils aligns with many of the objectives of the LGIF project, it is recommended that the projects proposed be managed through the LGIF project. That project also has an oversighting body, the Local Government Online Services Delivery Action Committee (LGOSDAC) which is composed of senior representatives from each of the LGAs who are currently undertaking Networking the

Nation projects in their respective State and Territory. The LGIF project also reports for ultimate sanction to a Board of Management composed of all Chief Executive Officers of the LGAs throughout Australia. Given this focus, it would appear that to manage the three proposed projects under the governance framework of the national LGIF project would maximise synergies and enhance the possibility of successful sector-wide outcomes.

From a management perspective, any LGA could undertake one of the projects on behalf of the ALGA and this decision is beyond the scope of this report to make a recommendation about – only to suggest that the LGOSDAC be involved in determining the best way forward to commence the implementation of IM/KM within Councils.

7.4.1 Recommendation 1

That the three proposed projects of

- Education and Awareness;
- Development of a Business Case; and
- Creation of a toolkit for Councils

be commenced as soon as possible to maximise synergies between the other national projects underway and the programs each LGA are undertaking through the Networking the Nation program.

7.4.2 Recommendation 2

That the ALGA be charged with the governance of any projects undertaken regarding IM/KM for Councils in the first instance and that the findings and recommendations of this report be integrated into the LGIF project.

Appendix 1: Developing a Knowledge Management Framework: Approaches, Tools and Techniques

As the discussion above has indicated – Knowledge Management means different things to different people. Indeed, a review of the literature reveals a diverse range of management theories, applications, tools and technologies being applied under the term KM. While it is clear that KM is a complex multi-dimensional concept, this does little more than confuse and frustrate those individuals and groups wishing to move forward with a knowledge management strategy.

However, the considerable interest in KM does alert us to a shift away from the questions over whether to move forward with a KM strategy? *To* questions over how given the range of options available should one move forward with implementing KM? In this environment it is imperative that organisations have a means to navigate and understand KM and how it can help them meet their organisational objectives.

In this context, this section presents a spectrum-based framework for information and knowledge management. This KM spectrum adapted from the work of Derek Binney (2001) is useful in two key respects:

- It enables a comprehensive assessment and positioning of the diverse range of perspectives expressed under the term KM. This is vital in reducing confusion and facilitating communication. It also enables the targeting of particular strategies in regard to implementing particular types of KM strategies;
- It provides a detailed checklist of the broad range of available KM technologies and applications. This is important for enabling organisations to assess their current levels of KM activity and to plan and implement future strategic KM activities.

The strength of this model is that enables an organisation to identify the types of KM strategies, tools and techniques that are most attuned to its objectives and existing capabilities and provides a framework within which to plan and implement them. i.e. facilitating concentration on what an organisation wants to achieve and how to go about it. Given the variations in local council size, location and human and IT resources this framework opens up the possibility for planning a variety of strategies from the comprehensive through to the incremental.

KM Applications

Within the literature there are a broad range of KM applications identified. These applications can be categorised according to the type of business issue/idea they are focus on e.g. knowledge creation, knowledge storage/retrieval etc. Within the framework presented here these are referred to as elements – six can be identified in discourses on KM: Transactional; Analytical; Asset Management; Process Based; Developmental; and, Innovation/creation of knowledge. Combined these ‘elements’ constitute the KM spectrum framework – these elements and their associated applications are illustrated in the top half of figure 1 (Knowledge Management Applications). These 6 elements are discussed in turn.

Figure 4. Adaption of Binney's KM Spectrum.

	Transactional	Analytical	Asset Management	Process	Developmental	Innovation & Creation
Knowledge Management Applications	-Case-Based Reasoning (CBR) - Help-desk applications - Customer Service Applications - Order Entry Applications - Service agent support Applications	- Data Warehousing - Data Mining - Business Intelligence - Management Information systems - Decision Support Systems - Customer relationship Management (CRM)	-Document Management -Content Management - Knowledge repositories - Knowledge Valuation -Intellectual Property	- Best Practices -Quality Management -Bench-marking - Process Improvement - Quality - Management Improvement - Process automation - Lessons Learned - ISO 9XXX - Business Process re-engineering	- Training - Teaching - Learning - Staff Competencies - Skills Development	- collaboration - Networking - Multi-disciplinary teams - Research & development - Discussion forums - Communities - Virtual teams
Enabling Technologies	-Expert Systems - Decision trees, rule induction - Semantic networks - GIS - probability networks	- Data analysis & reporting tools - Relational & Object DBMS - web crawlers - intelligent agents - push technologies	- Document Management tools - Library Systems - Search & Retrieval engines	- Workflow Management - Process Modelling Tools	- Online training - Computer based training	- Email - Voice mail - bulletin boards - video-conferencing - groupware
Internet, Intranets, Extranets, VPNs, Entry Point Portals						

Transactional KM

Here the 'use of knowledge is embedded in the application' such that in completing a task or transaction it is presented to the user. An example is Case-based reasoning (CBR) which enables the presentation of previous cases (knowledge) to the user when similar situations arise. As in column one above applications like customer service or order entry are good examples - access to and presentation of this knowledge is driven by the application (not the user).

Analytical KM

Here 'KM provides interpretations of, or creates new knowledge from, vast amounts or disparate sources of material'. Trends or patterns are generated from data sources to

enable informed action. As in column two above applications like business intelligence or decision support systems are good examples - knowledge here is often presented in the form of scenarios or trend analysis.

Asset Management KM
Here 'KM focuses on processes associated with the management of knowledge assets'. This has two dimensions: management of explicit (codified) knowledge and the management of intellectual property and processes associated with its creation/exploitation and protection. As in column three above applications like document management systems and content management systems are good examples - knowledge assets here are often complex and frequently require codification activities.

Process KM
Here KM covers 'the codification and improvement of process, also referred to as work practices, procedures or methodology'. Here KM has often grown out of other disciplines like BPR or TQM. The knowledge assets here are often ones that have been 'engineered' such as documenting 'best practices'. As in column four above applications like benchmarking and quality management are good examples - knowledge here is often improved by internal lessons/learning.

Developmental KM
Here KM focuses on 'increasing the competencies or capabilities of the organisation's knowledge workers'. This involves investing in intellectual/human capital through training and staff development. As in column five above applications like learning and training are good examples - knowledge here involves explicit training but also on creating environments for a learning/sharing of tacit knowledge.

Innovation/Creation KM
Here KM is focused on 'providing an environment in which knowledge workers' can create new knowledge either individually or increasingly in teams. As in column six above applications like virtual teams and discussion forums are good examples - this is one of the most popular topics in KM literature and is aligned to discussions of organisational innovation.

In figure 4 the bottom half maps KM enabling technologies on to the six KM elements described above. There are a number of technologies that can be described as 'pervasive' in that they can be assigned to all the six elements – these are included at the bottom of figure 4 and include the Internet and Intranets.

Applying the Framework
The framework as presented in figure 4 can be deployed in two main ways: firstly, and most obviously as a framework to enable people to understand the KM landscape, and secondly, as a KM assessment and strategic planning tool to enable organisations to identify and plan KM related investment strategies. Only the second of these is discussed here.

The KM applications and enabling technologies presented in the framework can be deployed as a 'checklist to inventory KM related activities and investments – past, present and projected for the future'. The framework enables organisations to generate a

coherent framework to incorporate existing, perhaps fragmented knowledge related activities. Before an organisation can move forward it is critical that it has a clear understanding of its existing KM activities so that these can act as stepping-stones for future initiatives. By collating and analysing the range of knowledge related activities that an organisation is engaged in, it becomes possible to assess and evaluate the level of investment that has been placed on what may previously have been viewed as unrelated activities - enabling the question 'Does this profile of KM investment seem right given where we think we need to take the organisation?'

Clearly, it is beyond the scope of this report to examine the processes of 'establishing business issues, challenges, needs and priorities, and using these to shape a KM strategy'. However, the framework does facilitate the consideration of the whole range of options. At the broadest level, this framework enables organisations to understand KM in all its multi-faceted complexity. The framework also enables 'management to balance its KM focus and establish and communicate its strategic KM direction'.

Above all it sensitises us to the organisational, technical, contextual and philosophical dimensions of moving forward with a KM implementation.

Appendix 2: The Zachman Framework

	Data (What)	**Function (How)**	**Network (Where)**	**People (Who)**	**Time (When)**	**Motivation (Why)**
Objectives /Scope	List of things important to the enterprise	List of processes the enterprise performs	List of locations where the enterprise operates	List of organizational units	List of business events / cycles	List of business goals / strategies
Business Owner's View	UML use cases (text based) and use case diagrams	UML activity and sequence diagrams	Logistics network (nodes and links)	Organization chart, with roles; skill sets; security issues.	Business master schedule	Business rules
Architect's View	Object oriented design model: High level Class diagrams	Essential Data flow Diagram - UML activity and sequence diagrams & application architecture	Distributed system architecture	Human interaction architecture (roles, data, access); Security requirements	Dependency diagram, entity life history (process structure)	Business rule model
Technology Designer's View	Detailed Class diagrams, XML Schema Data architecture (tables and columns); map to legacy data	System design: structure chart, pseudo-code	System architecture (hardware, software types)	User interface (how the system will behave); security design	"Control flow" diagram (control structure)	Business rule design
Builder's View	Data design (de-normal-ised), physical storage design	Detailed Program Design	Network architecture	Screens, security architecture (who can see what?)	Timing definitions	Rule specification in program logic
Functioning system	Converted data	Executable programs	Communica-tions facilities	Trained people, using the system	Business events	Enforced rules

References

Alavi, M. & Leidner, D.E. (1999) Knowledge Management Systems: issues, challenges and benefits, Communications of the Association for Information Systems 1(article7).

Alavi, M. & Leidner, D.E. (2001) Review: knowledge management and knowledge management systems: conceptual foundations and research issues, MIS Quarterly, 25 (1) pp.107-136.

Armbrecht, FMR, Chapas, RB, Chappelow, CC, Farris, GF, Friga, PB, Hartz, CA, McIlvaine, ME, Postle, SR and Whitwell (2001) Knowledge management in research and development, *Research Technology Management,* 44 (4): 28-48

Audretsch, DB, (1999)"Knowledge spillovers and the role of small firms", International conference: Knowledge Spillovers and The Geography of Innovation A comparison of National Systems of Innovation

Aylen, D. (2001) Knowledge management: harnessing the power of intellectual property, *Ivey Business Journal,* 65 (4), 58-63

Binney, D. (2001) The Knowledge Management spectrum – Understanding the KM Landscape, Journal of Knowledge Management, Vol.5 (1) pp.33.42.

Blili, S and Raymond, L (1993) Information Technology: Threats and Opportunities for Small and Medium-Sized Enterprises, *International Journal of Information Management, 13,* 439-448

Carlsson, SA (2001) "Knowledge management in network contexts", 9th Europrean Conference on Information Systems, Bled, Slovenia, June 27-29

Davenport, T.H., Jarvenpaa, S.L. & Beers, M.C. (1996) Improving knowledge work processes, Sloan Management Review (summer) pp.53-65

Davenport, T.H., & Prusak, L. (1998) Working Knowledge: how organisations manage what they know, Harvard Business School Press, Boston, Massachusetts.

Drucker, P (1995) *The Post-Capitalist Society,* Butterworth-Heinemann, Oxford

Dyer J and Singh H (1998) The relational view: co-operative strategy and sources of interorgansiational competitive advantage, Academy of Management Review, 23(4), 660-679

Fisher, HM, Brown, J, Porac, JF, Wade, JB, DeVaughn, and Kanfer, A (2000) Mobilizing knowledge in interorganizational alliances, in *The Strategic Management of Intellectual Capital and Organizational Knowledge,* Choo, CW and Bontis, N (eds), (2001), Oxford University Press, New York URL: http://www.dkrc.org/papers/AllianceChapter.pdf

Grant, RM (1997) The knowledge-based view of the firm: implications for management practice, Long Range Planning, 30(3) 450-454

Gulati, R, Nohria, N and Zaheer, A (2000) Strategic Networks, *Strategic Management Journal*, 21: 203-215

Hagman, C and McCohan, P (1993) Strategic Information systems and competitiveness, *Information and Management*, 25, 183-192

Hoskisson, RE, Hitt, MA, Wan, WP and Yin, D, 1999, "Theory and research in strategic management: swings a pendulum", Journal *of Management*, 23(3), 417-21
Huber, G. P. (1991) Organisational Learning: the contributing processes and the literatures, Organisation Science, 2 (1) pp. 88-114.

Kim, W.C. and Mauborgne, R (1999) Strategy, value innovation, and the knowledge economy, *Sloan Management Review*, 40 (3), 41-53

Land, L.P.W., Land, M.H., Handzic, M. & Aurum A. (2001) Codifying Organisational Knowledge: A case study, pp.11-26, Knowledge Management in Context (eds)F. Burstein & H Linger, Australian Scholarly Publishing, Melbourne.

Malhotra, Y. (2000) Knowledge Management for E-business performance, Information Strategy, the Executive Journal 16/4 (www.brint.com)

Nonaka, I. (1994) A dynamic theory of organisational knowledge creation, Organisation science 5(1) pp.14-37.

Nonaka, I. & Takeuchi, H. (1995) the knowledge creating company: How Japanese companies create the dynamics of innovation, Oxford University Press, New York.

Porter M.E. (1980) *Competitive Strategy*, Free Press, New York

Rivette, KG and Kline, D (2000) Discovering New Value in Intellectual Property, *Harvard Business Review*, 78(1): 54-66

Senge, P. M. (1990) The fifth Discipline: the art and practice of the learning organisation, Sydney, Random House.

Schrage, M (2002) Interview with Knowledge Inc., Austin, Texas, September edition

Spender, JC (1996) Making knowledge the basis of a dynamic theory of the firm, *Strategic Management Journal*, 17 (Winter Special Issue), 45-62

Speigler, I. (2000) Knowledge Management: a new idea or a recycled concept ? Communications of the Association of Information Systems, 3(14).

Stamper, R. (1998) A Dissenting Position, in Falkenberg, E. et al, A framework of Information Systems Concepts: The FRISCO report (web edition) IFIP pp.191-96.

Stewart, T. (2000) Intellectual Capital: The New Wealth of Organizations, Currency Doubleday.

Sveiby, K.E.n (2000) A Knowledge-Based Theory for Strategy Formulation, ANZAM Conference, Macquarie University, Australia.

Sviokla, J. J. (1996) Knowledge Workers and radically new technology, Sloan Management Review pp.25-40.

Teece, DJ, Pisano, G and Shuen, A (1997) Dynamic Capabilities and Strategic Management, *Strategic Management Journal*, 18(7) 509-533

Teece, DJ (2000) *Managing Intellectual Capital*, Oxford University Press, Oxford