

# USER ACCESS TO KNOWLEDGE REPOSITORIES A NEW ZEALAND CASE STUDY OF TAXONOMY DEVELOPMENT

Elizabeth CASTLE,<sup>1</sup> castlel@rbnz.govt.nz

Gerry MCCULLOUGH,<sup>2</sup> Gerry.McCullough@openpolytechnic.ac.nz

Gillian OLIVER,<sup>2</sup> Gillian.Oliver@openpolytechnic.ac.nz

1. Reserve Bank of New Zealand. Knowledge Centre (Wellington, New Zealand)
2. Open Polytechnic of New Zealand. School of Information and Social Sciences (Lower Hutt, New Zealand)

## Abstract

Electronic documents are essential components of corporate memory in organisations. The strategies and tools used to organise electronic documents are key to successful access of the knowledge they contain. This paper explores this topic by presenting a case study of a public sector body in New Zealand and the implementation of a new knowledge repository. The case study describes user involvement in knowledge organisation and the development of a taxonomy to aid in the management of electronic content in a specialist environment.

## Keywords

knowledge management in government, repositories, taxonomies, term selection, electronic document management, central banking, Reserve Bank of New Zealand

## 1 INTRODUCTION

New Zealand is a dynamic environment for knowledge management activities, particularly in the public sector (McCULLOUGH 2004), and the organisation of the corporate memory is a key concern. Electronic information is a critical component of the corporate memory, but frequently poorly managed. The purpose of this paper is to consider strategies and tools to organise the knowledge thus contained. It explores this topic by presenting a case study of a public sector body in New Zealand and the implementation of a new knowledge repository. The case study describes user involvement in knowledge organisation and the development of a taxonomy to aid in the management of electronic content in a specialist environment, and suggests that this taxonomy will have international applicability. The specialist environment under consideration is that of central banks. The paper is organised as follows. The first part considers the key terms used. This is followed by a description of the corporate en-

vironment of the case study. Issues encountered in implementing document management systems are considered. Finally, the conclusion summarises lessons learnt relating to user involvement in organising knowledge, and taxonomy development.

## 2 DEFINITION OF KEY TERMS

### 2.1 Corporate memory

Knowledge management in organisations should facilitate the flow of information to support decision-making and establish and maintain a recorded memory containing information artefacts, including documents and records created and stored electronically. The organisation's information store or memory is therefore crucial.

Corporate memory has been defined as stored information from an organisation's history that can be brought to bear on present decisions, with information relating to decisions made and problems solved at its core (WALSH 1991). Corporate memories can have short and long-term components, with the actual length of time involved varying according to the nature of the business and its requirements (STEIN 1995).

The extent to which memory influences and informs future actions will vary according to organisation (ANAND 1998). The nature of organisational memory has been linked to an organisation's personality (WEICK 1979) and its ability to learn; i.e., learning is dependent on previously acquired knowledge stored in its memory (ARGYRIS 1978; ROBESY 1995). The learning ability of an organisation is crucial for its success. If it easily forgets, it is continually re-creating itself on a subset of the totality of experiences that make up its memory. These concepts of the learning organisation and organisational memory have been linked to the problem of anthropomorphism (WALSH 1991). The implications are that organisations are in themselves cognitive entities. The danger is that attention will not be paid to the cultural values of individuals who collectively make up that organisation, therefore when considering the management of information within organisations, analysis has to extend beyond these formal systems to the way in which individuals interact with information.

### 2.2 Taxonomy

Taxonomy has been defined as the science of classification. The purpose of a taxonomy is to establish a

... stability of nomenclature through the aegis of a formalized and universally accepted language that facilitates transmission of knowledge across time and the barriers of natural language (JACOB 2004, p. 523).

The concept of a universally accepted language is particularly relevant to the case study reported here. A key objective of the development

of an appropriate taxonomy to organise documents in the case study institution, is the applicability of that taxonomy to other institutions with similar functions and responsibilities, located in other parts of the world.

## 2.3 Central banking

Central banks are a specific type of bank, and are distinct from commercial or trading banks. The functions of central banks may include maintaining price stability, ensuring the integrity of financial supervision including banking oversight, and meeting the currency needs of the public. They can be either country specific (e.g., the Banco de España) or established for a particular region (for example, the European Union's European Central Bank). A website listing maintained by the Bank for International Settlements in Basel indicates over 150 central banks worldwide (BANK 2004).

## 3 THE RESERVE BANK OF NEW ZEALAND

New Zealand is a country with relatively small population (4 million), with large concentrations of the population in five main urban centres, Auckland being the largest with around 1 million, located about 700 km from Wellington, the nation's capital. New Zealand has a well-developed information infrastructure and has been compared to Finland in terms of its economic growth capabilities (WATSON 2002). Organisations in New Zealand are likely to be typically of the market bureaucracy type, where more reliance is placed on personal relationships between employees than on rules and hierarchies (HOFSTEDE 2001; MEAD 1990).

The Reserve Bank of New Zealand (RBNZ) has played the leading role in developing the independence model of central banking. According to legislation (the Reserve Bank of New Zealand Act 1989), it is required to independently manage monetary policy to maintain price stability. During the 1990s it pioneered inflation targeting, banking supervision based on disclosure, and a wholesaling approach to cash management (RESERVE 2004). In addition, the Bank also issues New Zealand's currency.

Internally, RBNZ's approach to knowledge management has continued this tradition of innovation. The Bank was a very early adopter of document management technology, and has used an electronic document management system since the early nineties. It was the first New Zealand government agency to combine information technology and information management functions organisationally, and to take a holistic approach to information management by incorporating library and archival functions in a single organisational unit. In order to more accurately convey the broad scope of its responsibilities, the Bank's library was renamed «Knowledge Centre» in 1996. At the time, this was considered sufficiently unusual to be worthy of critical comment in New Zealand's national press.

Overseas, solutions that have been devised to assist with the management of electronic documents in the public sector have included the DOMEA concept in Germany (ENGEL 2003), the PIVOT project in the Netherlands (MCKEMMISH 2005, p. 189-190) and SGDA in Catalonia (SERRA 1999). It is noteworthy that the German and Spanish systems were based on existing records management practices, that is, a registry system of recording information relating to incoming and outgoing correspondence. In New Zealand, most if not all public sector bodies would have discontinued such practices in the restructuring of the sector that occurred in the 1980s. Consequently it cannot be assumed that the current generation of employees of government agencies in New Zealand will be convinced of the need to apply recordkeeping principles to documents, or be aware of the implications of not doing so.

### 3.1 Document management

The RBNZ was the second site for document management in New Zealand when it implemented PC Docs in December 1993. During 2004 a bank-wide project selected a replacement document management system with greater functionality, and implementation of this began in 2005.

A classification system for both electronic and paper documents had been developed, and was an integral feature of the initial document management system. Users were required to specify a file for all documents created, and also to assign keywords to documents. Experience has shown that a very low percentage of staff actually took responsibility in ensuring that documents were filed appropriately, and review of the contents of electronic files show that ease of use, i.e., default to the first available file number, more often than not appeared to be the factor that determined the classification of the document. Therefore the first available file (intended for documents relating to high level monetary policy decision making) in a drop-down list contains a diverse range of unrelated documents, including for instance a fax relating to avocado growing, and taxi travel in Wellington as well as all aspects of monetary policy. Furthermore, the closure of this particular file some years previously did not deter users from continuing to add documents to it.

These attitudes were also reflected in the selection of keywords to documents created. Users were required to apply up to three keywords from a controlled list of terms. It was compulsory to assign at least one keyword. What in fact happened was that people established generally applicable default terms such as «administration» or «inflation» which were then assigned to all documents they created, regardless of content. Review of the keywords assigned to documents and assessment of their relevance showed that they were of so little value that the contents of this field were not migrated across to the new system.

A further problem encountered in establishing an organisation-wide framework for the management of electronic documents was user reluctance to regard emails as a part of the corporate memory, and to continue storing these as personal communications.

### 3.1.1 New taxonomy development

A new fileplan has been developed, based on the existing file classification but refining it to better reflect the bank's functions and activities by using internal expertise, and decisions about the length of time records need to be maintained documented in the retention schedule approved by the national archives authority. Initially it was planned to use functionality inherent in the new document management system to build the classification, but lack of time, resources, and limited knowledge within the Bank of a brand new software system, proved prohibitive.

The fileplan provides a high-level classification of central banking functions, and forms the framework for the taxonomy. A standard process model: analyse –design, build, test, refine– implement, monitor and maintain (HARRIS 2003) was followed for the taxonomy development. Each function is being considered in turn, beginning with specialist areas such as monetary policy and financial stability and concluding with supporting functions such as information technology. A content management tool which is a part of the Bank's new document management system is being used to identify appropriate terms which are relevant to each function, and to assign a weighting to those terms.

A key element of the development was user participation especially during the design / refine phase. A taxonomy group «Find – It» was formed, consisting of subject matter experts with a wide breadth and depth of understanding of the business of central banking plus information management and technology representation.

Inclusion of representation from the Bank's Data Unit was also considered critical for the Bank to achieve its desired outcome of standard taxonomy application across all types of information resident within the Bank's information systems. As well as the standard format types of unstructured content (.txt,.doc,.pdf,.xml,.html,.tiff,.xls), audio and video files, SMS, email, Visio and Mindmapper, the Bank is keen to utilise the developed taxonomy for greater interrogation of its statistical databases, not only to gain more relevant search results but also to aid conceptual classification and enhanced business analysis.

Information management staff used an information extraction engine to extract file properties, metatags and delineable text from parsed content for the initial establishment of the information vocabulary. Subject matter experts then tested the results against their own knowledge, expertise and understanding. During the refine stage weightings against terms were changed to better reflect the importance and rankings of the terms. The results were then retested with subject matter experts. To date the taxonomy developed has not been tested against a wider Bank audience and remains in a test environment.

Initially the taxonomy is being customised for the RBNZ specifically, and then further development will be in collaboration with other central banks. The resulting schema will be made available to other central banks for comment and trial, and input into its future development will be encouraged. The Bank of England and the Bank for Inter-

national Settlements have expressed interest in involvement in this project.

Two document sets are being used to identify the terms and phrases that reflect the Bank's activities. One document set consists of documents stored electronically since 1993. The other document set is composed of emails covering the same period. The use of both document sets as sources of data is considered important in order to provide comprehensive coverage of both formal and informal communications, therefore ensuring that the resulting taxonomy reflects any language variations that are unique to different communication formats.

The resulting thesaurus of terms will be an authoritative yet dynamic tool, modified to reflect any changes in terminology that occur. For instance, the tools used for inflation targeting change over time. Currently the prevalent tool is the official cash rate, or OCR. Previously, the monetary conditions indicator, or MCI was the preferred measure. The content management tool will handle the ongoing maintenance of the thesaurus. It will automatically identify new language used, and can then build relationships between terms.

The problem of incorporating emails into the corporate memory is being addressed partly by the implementation of the new document management system which can manage this format, but also by minimising as much as possible the extent to which users have to actively engage with the system in order to accomplish this step. The fileplan structure is mirrored in the Microsoft Outlook interface where desktop users manage their email correspondence. Dragging and dropping an email into an Outlook folder adds the email to the corporate knowledge repository, because it will be automatically picked up by the document management system. Currently this has posed some problems in ensuring that any changes to the fileplan are reflected in Microsoft Outlook, and maintenance of a master spreadsheet which documents the fileplan and linkages to the retention and disposal schedule is considered essential.

The problems encountered earlier with misfiling electronic documents have not been addressed *per se* by the new document management system. The old file classification has been mapped to the new fileplan –any misfiled documents have therefore continued to be misfiled. It has therefore been essential to develop a tool that will provide another layer of filtering. The development of an accurate taxonomy is considered essential in order to provide a wide variety of accurate access points to electronic content, including that outside the scope of the document management system –for example, the material on the bank's website.

## 4 CONCLUSIONS

Although formal systems had been established to capture and organise electronic documents, lack of recognition or understanding by users of the significance of corporate memory did not contribute to building an effective repository. The extent to which this factor needs to be consid-

ered in the development and design of systems is likely to be influenced by the culture of the organisation concerned.

Automatic application of metadata to electronic documents minimises user responsibilities in selecting and assigning appropriate terms. Experience with document profiling and user input has indicated that where possible, software tools should be used to maintain the integrity of corporate knowledge organisation systems. Taxonomies need to be relevant to user needs, intuitive to use and reflect the shared understanding of subject matter experts. International collaboration and knowledge sharing between organisations with similar functions will result in sector specific taxonomies that are indeed «universally accepted languages».

## REFERENCES

- (ANAND 1998) ANAND, V., MANZ, C. C.; GLICK, W. H. «An organizational memory approach to information management». *Academy of Management Review*, v. 23, n. 4 (1998), p. 796-809.
- (ARGYRIS 1978) ARGYRIS, C.; SCHON, D. A. *Organizational learning: a theory of action perspective*. Reading, MA: Addison Wesley, 1978.
- (BANK 2004) Bank of International Settlements. *Central bank websites* [electronic resource]. BIS, 30 November 2004. <<http://www.bis.org/cbanks.htm>>. [Cited 26 February 2005].
- (ENGEL 2003) ENGEL, A.; WETTENGEL, M. «The DOMEA concept: from project to practice». *Information Management Journal*, (2003), p. 49-56.
- (HARRIS 2003) HARRIS, K.; CALDWELL, F.; KNOW, R. E. «A process model for creating a taxonomy». *Gartner Research Report #408663*. (Gartner, Inc, 2003).
- (HOFSTEDE 2001) HOFSTEDE, G. *Culture's consequences: comparing values, behaviors, institutions, and organizations across nations*. 2nd ed. Thousand Oaks, CA: Sage Publications, 2001.
- (JACOB 2004) JACOB, E. K. «Classification and categorization: a difference that makes a difference». *Library Trends*, v. 52, n. 3 (2004), p. 515-540.
- (MCCULLOUGH 2004) MCCULLOUGH, G.; OLIVER, G.; SYMONDS, J.; BROWN, M. *Knowledge management: a New Zealand survey into current practices*. The Open Polytechnic of New Zealand, 2004. Working Paper.
- (McKEMMISH 2005) McKEMMISH, S.; REED, B.; PIGGOT, M. «The archives». In: McKEMMISH, S.; PIGGOT, M.; REED, B.; UPWARD, F. (eds.). *Archives: Recordkeeping in society*. (Wagga Wagga, NSW: Centre for Information Studies, Charles Sturt University), p. 159-196.
- (MEAD 1990) MEAD, R. *Cross-cultural management communication*. New York: Wiley, 1990.
- (RESERVE 2004) Reserve Bank of New Zealand. *Central banking in New Zealand* [electronic resource]. 2004 <[http://www.rbnz.govt.nz/about/central\\_bankingnz.pdf](http://www.rbnz.govt.nz/about/central_bankingnz.pdf)>. [Cited 26 February 2005].
- (ROBEY 1995) ROBEY, D.; WISHART, N. A.; RODRIGUEZ-DIAZ, A. G. «Merging the metaphors for organisational improvement: business process reengineering as a component of organizational elearning». *Accounting, Management and Information Technologies*, v. 5, n. 1 (1995), p. 23-39.
- (SERRA 1999) SERRA, J.; CANELA, M.; CAMPOS, I.; DOMINGO, J. «The integration of electronic records into a records management system [electronic resource]: the process of cost optimization». *DLM-Forum* (2nd: 1999: Brussels, Belgium).

- <[http://europa.eu.int/ISPO/dlm/fulltext/full\\_serr\\_en.htm](http://europa.eu.int/ISPO/dlm/fulltext/full_serr_en.htm)>. [Cited 22 April 2005].
- (STEIN 1995) STEIN, E. W. «Organizational memory: review of concepts and recommendations for management». *International Journal of Information Management*, v. 15, n. 1 (1995), p. 17-32.
- (WALSH 1991) WALSH, J. P.; UNGSON, G. R. «Organizational memory». *Academy of Management Review*, v. 16, n. 1 (1991), 57-91.
- (WATSON 2002) WATSON, R.; MYERS, M. D. «IT industry success in small countries: the cases of Finland and New Zealand». In: TAN, F. B., (ed.). *Cases on global IT applications and management: successes and pitfalls*. (Hershey, PA: Idea, 2002), p. 226-250.
- (WEICK 1979) WEICK, K. E. *The social psychology of organizing*. Reading, MA: Addison Wesley, 1979.