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# **Knowledge Auditing and Mapping: A Pragmatic Approach**

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# **Knowledge Auditing and Mapping: A Pragmatic Approach**

## **Abstract**

Increasingly the knowledge and skills of employees are seen as valuable assets that may be utilised in order to gain competitive advantage at an organisational level. This paper seeks to describe the process, methods and resulting outcomes of a knowledge audit and map carried out within a tax department in a multinational oil exploration and production company. Although the department had employed systems for managing information, there was a desire to build on this to develop and apply systems and processes to manage and exploit knowledge embedded in staff. By using questionnaires and interviews, the audit and map process aimed to provide a critical first step in introducing knowledge management into the department, and establishing a plan of action.

## **Rationale**

Over the last decade, knowledge management has attracted considerable interest both from practitioners and academics as a range of methods for more effective management of intellectual assets within an organisational setting. Due to the advancement in information and communication technologies and the gradual transformation of the industrial economy to the new knowledge economy, both private and public sector organisations world-wide are now putting a greater emphasis on the roles of knowledge (DeLong and Summers, 2001). Early incarnations of knowledge management in organisations can be seen to have been

heavily focused on the use of Information and Communication Technology (ICT) in order to structure and store explicit knowledge (Skyrme, 1998). Increasingly however, organisations are appreciating just how limited this approach may be, stressing the importance of knowledge processes such as creating, identifying and exploiting knowledge and the significance of individuals within these processes. Indeed McElroy suggests that “valuable organizational knowledge does not exist – people in organizations create it” (McElroy, 2001). Therefore an individual’s ability to create, learn and use knowledge appears to increase the organisation’s ability to develop competitive advantage.

Over recent years both the knowledge audit and the knowledge map have been seen as important processes in determining and illustrating the knowledge within an organisation. Liebowitz, Rubeinstein-Montano, McCaw, Buchwalter and Browning believe the knowledge audit to be the first “critical” stage of introducing knowledge management into organisations (Liebowitz *et al*, 1999). Indeed, Frappaolo believes organisations need to ‘know what they know’ before they can attempt to introduce a knowledge management initiative (Frappaolo, 2000).

A knowledge audit is able to “describe what knowledge an organization has, who has it and how it flows (or doesn’t) through the enterprise. A knowledge audit can show what changes are needed in organizational and personal behaviour, business processes and enabling technologies so knowledge can be applied to improve competitive advantage. A successful audit can identify intellectual assets of value to the company... but it also is valuable in pointing out improvements to existing processes and identifying people who have been acting as barriers to knowledge

proliferation, whether inadvertently or on purpose” (Stevens, 2000). In effect then, the audit not only helps to determine where knowledge exists within organisations, but may also be seen as a type of roadmap indicating the best route to take in terms of process improvement. According to the Delphi Group “a successful knowledge audit accomplishes several things. It provides an overview of the strength and weaknesses of the organization; it offers a scientific analysis of the organization’s potential for competitive advantage; and it uncovers the benchmarks of successful knowledge management within an organization” (The Delphi Group, 1999). Generally a knowledge audit will help to identify: the knowledge needs of the organisation; what knowledge assets are available and where they are located; if knowledge gaps or bottlenecks exist; and the knowledge flow within the organisation.

Whilst there seems to be several ways of conducting a knowledge audit (see Skyrme, 2002, Liebowitz, 2000 and Liebowitz *et al.*, 1999), in general knowledge audits consist of: the identification of knowledge needs through the use of questionnaires, interviews and focus groups; the development of a knowledge inventory mainly focusing on the types of knowledge available, where this knowledge is located, how it is maintained and store, what it is used for and how relevant it is; analysis of knowledge flows in terms of people, processes and systems; and the creation of a knowledge map (National Electronic Library Health, 2001).

As part of this process the knowledge map may provide organisations with a pictorial representation of the previous steps. Vail (1999) defines knowledge mapping as “the process of associating items of information or knowledge (preferably visual) in such

a way that the mapping itself creates additional knowledge. ... The mapping process often creates intellectual capital value through the creation of new knowledge from discovering previously unknown relationships or gaps in expected ones” (Vail, 1999).

It is therefore evident that a knowledge map cannot be developed without some type of audit of existing knowledge. Many organisations however, may be unaware that they require an audit at all. Wiig (1993) believes there are several signs that an organisation requires a knowledge audit:

- Information overload or lack of information
- No awareness of knowledge or information available in the organisation
- Knowledge duplication through different departments; reinventing the wheel
- Common use of out of date knowledge or with no quality or value
- Not knowing where to find appropriate knowledge or expertise

Organisations that audit and map their knowledge and as a consequence know what they know can gain many benefits (Hildebrand, 1995). Benefits include: “identifying what knowledge is needed to support overall organisational goals and individual and team activities; it gives tangible evidence of the extent to which knowledge is being effectively managed and indicates where improvements are needed; provides an evidence-based account of the knowledge that exists in the organisation and how that knowledge moves around in and is used by the organisation; provides a map of what knowledge exists in the organisation and where it exists revealing both gaps and duplication; reveals pockets of knowledge that are not currently being used to good

advantage and therefore offer untapped potential; it provides a map of knowledge and communication flows and networks, revealing both examples of good practice and blockages and barriers to good practice; it provides an inventory of knowledge assets allowing them to become more visible and therefore more measurable and accountable and giving a clearer understanding of the contribution of knowledge to organisational performance; and it provides vital information for the development of effective knowledge management programmes and initiatives that are directly relevant to the organisation's specific knowledge needs and current situation" (National Electronic Library Health, 2001).

In order to reap these benefits and provide value, companies will be expected to put in place strategies or recommendations based on the findings of the knowledge audit and the knowledge map. These processes will help to provide insight into the use and practice of knowledge within the organisations it will also allow evaluation of the knowledge activities and processes and identify potential areas for improvement. Wexler (2001) suggests that effective knowledge mapping can produce economic, structural, and organizational and knowledge returns for organisations (Wexler, 2001).

This paper aims to outline the knowledge audit and mapping processes carried out in a tax department within a large multinational oil company. It describes the process stage by stage focusing on the methods used and the resulting outcomes. Although different organisations may hold different types of knowledge and carry out different types of processes, it is hoped that this paper will essentially provide a basic outline that may be of potential benefit to other organisations.



## **Background to Project**

In late 2001 the tax department of a large oil company (consisting of twenty employees) identified a need to improve working practices through more formally managing the tacit and explicit knowledge held by its employees. The department approached the Centre for Knowledge Management (CKM) to aid them in this process.

The tax department had two main business objectives: to provide a high quality cost-effective service to the company as a whole enabling it to minimise its long term tax liability, and also to deliver the lowest achievable Effective Tax Rate (ETR). The tax department also played a critical value-added role in commercial decision-making by actively seeking to achieve tax savings by influencing the business to conduct its operations in a tax efficient way, optimising tax compliance activity and successfully closing negotiations on difficult issues which arose from business operations. There was a belief that the intellectual capital of the department could help to achieve tax savings and to enable the department to fulfil its statutory fiscal obligations.

CKM proposed that the most beneficial way to improve the management of knowledge within the department was to develop and implement a process of change that would in turn lead to the establishment of a knowledge sharing culture within the department by implementing and/or improving knowledge-based processes. In order to achieve these aims, it was proposed that, CKM would act as a facilitator of these stages, and help the department to determine their own strategy. This would teach the department as a whole how they could help to manage their own knowledge on their own initiative.

## **Aims and Objectives**

The knowledge management audit and map were intended to develop an understanding of how knowledge is currently utilised within the organisation, and to develop a pictorial representation of these knowledge-based processes (for example, the storage and transfer of knowledge) and objects (such as databases or people). The process also sought to determine other key factors: a knowledge management strategy for the department and the necessary steps to be taken to achieve this strategy.

The main objectives were:

- To determine where knowledge exists within the tax department
- To identify the type of knowledge forms which exist within the tax department
- To identify the preferred methods of knowledge transfer within the tax department
- To investigate how knowledge is then applied by employees within the department
- To measure the value of current individual and organisational performance relating to the six step KM process
- To establish a benchmark of best practice within the department
- To develop a knowledge management strategy for the department
- To establish an implementation plan in order to achieve this strategy

## **Methodology**

In order to achieve these aims and objectives, an eight-phase approach was adopted to assist the department to achieve its objectives:

Preliminary Phase.	Setting the Scene
Phase 1.	Learning Day
Phase 2.	Measurement Criteria
Phase 3.	Audit Interviews
Phase 4.	Development of Knowledge Map
Phase 5.	Feedback Event
Phase 6.	Implementation Plan Development
Phase 7.	Implementation

### **Preliminary Phase.                      Setting the Scene**

From some preliminary meetings with the tax department's senior management a better understanding of the current situation was developed. As in many other large organisations, knowledge and knowledge management were concepts that were being raised at a strategic level by senior managers. However, the department had been exposed to the concept of knowledge management through a variety of knowledge management initiatives that had been implemented at the operational level. The department had conducted work in a related area over the previous years running a number of workshops on topic such as document management and knowledge management, but had yet to turn their awareness of those topics into working practice.

With this in mind, the knowledge audit and map process was based around a theoretical and generic model of knowledge processes developed by CKM for application within research, consultancy and teaching environments. Knowledge management can be seen as “the systematic, explicit, and deliberate building, renewal, and application of knowledge to maximize an enterprise’s knowledge-related effectiveness and returns from its knowledge assets” (Wiig, 1997). Several authors have proposed models for knowledge management which collectively comprise of several different processes. A number of these models were researched such as Wiig’s four stage model (Wiig, 1993) and O’Dell’s seven steps model (O’Dell, 1996) and key elements were selected from these and added to CKM’s own ideas to develop a useful conceptual model. The model is based around 6 knowledge processes as described below:

- **Acquisition and Learning** - learning, acquiring new knowledge from people, books, websites etc
- **Storage and Maintenance** - storing knowledge to make it easily accessible to all who may require it and ensuring that it is kept up-to-date and relevant
- **Application and Exploitation** - putting knowledge to use, deriving benefit from it in carrying out work
- **Dissemination and Transfer** - proactively sharing knowledge with others (formally or informally) on a one-to-one or a one-to-many basis verbally, in written form, electronically etc
- **Knowledge Creation** - using knowledge to create value through new ways of doing things, new products or services

- **Performance Measurement** - determining how well the above activities are carried out and how they impact on work focusing on measurable benefits

A comprehensive literature review of relevant material was carried out initially in order to set the scene and develop an understanding of current best practice. Several meetings with the client were arranged to ascertain the needs of the department and gain an understanding of the department and its strategic objectives. Based on the KM process model identified above, a questionnaire was distributed to all 20 members of staff in the tax department from the clerical assistant through to the manager of the tax department. The purpose of this survey was to identify what knowledge-based processes currently exist at both a personal and a departmental level. Under each of the six activities in the knowledge management process model employees were asked to express their opinion and describe current processes and situations. They were asked to describe the types of knowledge they used on a day to day basis, the formats and sources used, how they carried out each process, the benefits gained from carrying out these processes, the problems associated with each process and suggested improvements if any.

The results from this survey were revealing. Although individuals used different types of knowledge from various sources depending on their roles within the department, the results suggested there were no defined or standardised procedures relating to the processes which were identified above throughout this particular department with little or no induction process for new employees. As a result, people did not know what they were expected to know, and also did not know what they were looking for or where to look. The results also provided evidence to suggest that

although there was no central access point to knowledge and very little quality control, the department as a whole showed a willingness to share knowledge albeit only certain types of knowledge. Overall the results confirmed that there was a need to establish some type of formalised knowledge management approach to improve processes.

### **Phase 1.                      The Learning Day**

The learning day event was intended to be a one-day interactive event designed to allow the staff within the department to develop a common understanding of knowledge management and its potential benefits for individuals, the department, and the organisation as a whole. As recommended by Speel et al (1999) the learning day itself was an important part of the overall process as there was little knowledge of the practicalities of knowledge management within the department. Therefore in order to avoid people feeling excluded from the project, the learning day was intended to emphasise the importance of ownership of the project by the employees. In addition the data collated and analysed from the questionnaires in the Preliminary Phase was fed back to the department.

The learning day event aimed to get staff to 'buy in' to the project, and to understand their own role within it. It would also help individuals to develop an understanding of how the department aimed to apply knowledge management and to inform further phases of the project. The event also provided an opportunity for discussion and clarification of issues surrounding KM in general and the project in particular.

The learning day had four main components:

- Setting the Scene - KM: Where are we now?
- Examples and Best Practice.
- Why me? Why us?
- What have we learned?

Seen as the introductory session, 'Setting the Scene' also provided an opportunity to disseminate the findings of the questionnaire distributed during the preliminary phase of the project. While the second session provided an overview of best practices in a variety of different organisations, the third and fourth sessions focused on the employees: their role within the project, the potential benefits and their attitudes towards the success of the event.

A short feedback questionnaire was issued during the Setting the Scene session to determine whether the staff felt the objectives of the day had been achieved (see Figure 1). Feedback from the small questionnaire indicated that although approximately three-quarters of the staff members offered 'buy in' and understood the concept of KM and benefits on offer, only 61% understood their role within the project. This was certainly more positive than expected, however it did indicate that the roles of individuals within the department relating to the project would have to be clarified.

Take in Figure 1

## **Phase 2. Measurement Criteria**

Organisations are now introducing methods of measuring knowledge processes or intangible assets that may not rely exclusively on financial measures. Measuring the quality and effectiveness of knowledge processes has been recognised as an additional measure of the effectiveness of organisations in addition to financial measures. Knowledge outputs are intangible and as such can be difficult to quantify. Perkmann therefore believes “quantitative measures can be actually very limited in ‘measuring’ knowledge processes. For instance, usage is very easy to measure but there is no guarantee that this will actually result in individual or business performance” (Perkmann, 2002).

In this context, CKM aimed to measure each individual’s perceptions of the performance of the individuals and the department in carrying out the six knowledge activities or processes identified as the KM process model: Acquisition & Learning; Storage & Maintenance; Application and Exploitation; Dissemination & Transfer; Knowledge Creation; and Performance Measurement. Measuring the knowledge processes in this context would help to gain an understanding of how the individuals perceived their own performance in relation to the perceived performance of the department. It would also help to establish a benchmark and allow best practices to emerge.

The main aim of this project was to introduce and implement a process of change that would help to establish a knowledge sharing culture within the department by implementing and/or improving knowledge-based processes. As there was an



implicit belief in CKM that the more embedded the working practice, the more valuable it may be to the organisation as a whole, it was anticipated that this measurement criteria task would help to introduce behavioural change by ascertaining the current working practices within the department and suggesting improvements to develop knowledge-based processes. In effect, it was anticipated that this performance measurement task would help to change the behaviour of the individuals within the tax department allowing them to strive for best practice in relation to how they perform each knowledge-based process. It must therefore be noted that this stage focused on the performance and not the content of processes.

Each member of staff within the tax department was asked to complete a measurement criteria table for performance of both the individual and the department relating to the six knowledge activities. These performances were determined by disseminating questionnaires using closed questions to all twenty employees within the tax department. Statements relating to the six knowledge processes of the KM process model were given a numerical value on a scale from 1 – 6:

Score 1 - This activity does not occur

Score 2 - This activity happens occasionally

Score 3 - This activity is done on an ad hoc basis

Score 4 - This activity happens frequently even when unsolicited

Score 5 - This activity is carried out regularly as a separate activity

Score 6 - This activity is embedded in working practice

These scores aimed to show working practice within the department in relation to the knowledge processes with the scores gradually increasing from Score 1: this activity does not occur to Score 6: this activity is embedded in working practice indicating a gradual improvement to score 6 which is deemed as best practice and the score to which the employees would be expected to aspire. It was anticipated that this would help to identify who was doing what in relation to knowledge-based processes and as a result identify individuals who needed to improve the performance of their knowledge-based processes. While each member was expected to eventually embed all processes in working practice, the management did not envisage the improvement to be immediate. Therefore, a gradual improvement would be apparent where each member would gradually improve score by score until he/she reached score 6 and embedded the processes in their working practice.

Once each individual had completed the measurement grid, the scores were then collated and a score was calculated for each activity per person in the department. Over half of all the scores received were the same for both the individual and the department i.e. individuals had placed their performance on the same level/score as the department. Only one respondent believed that the department performed better than himself/herself for all six knowledge processes with one other placing all his/her individual scores at the same level as the department. The remaining respondents produced various degrees of individual scores that were either lower, higher or the same as their departmental scores. Performance measurement produced low scores with a total average score of 2.6 for the individuals and 3.5 for the department. Indeed in relation to the individual and departmental total average scores all but the individual scores relating to dissemination and transfer were slightly lower than the

departmental scores. This suggests that there was a perception among the staff on average the department seemed to perform knowledge based processes more effectively. These scores also seemed to indicate that the individuals' perceptions of their own performance and that of the department depended on the role or level of the employees and length of service.

Once all scores were calculated these results were translated into radar diagrams (see Figure 2) giving the first pictorial representation of the current level of activity, both at individual and departmental level, in each of the six activities. Figure 2 provides an example of the individual and departmental performance as perceived by a member of staff within this particular department. It shows, for example, that while this individual believed the department as a whole applied and exploited knowledge regularly as a separate activity, this staff member felt that he/she carried out this activity on an ad hoc basis. Indeed, this diagram indicates that the department produced higher scores than the individual for each of the six activities suggesting that the individual felt that he/she did not perform these activities as well as the department as a whole.

Such comparison of the individual's perception of their own performance and that of their department consequently helped to identify the main areas for improvement. The results of the performance measurement criteria were then used in conjunction with the interview data from the next phase to produce a current knowledge management situation for each individual in the tax department.

Take in Figure 2

### **Phase 3.      Audit Interviews**

The knowledge audit is often seen as an important part of introducing knowledge management into an organisation. It is vital for an organisation to have an understanding of the knowledge assets that exist within it before it can begin to develop an improvement process or a knowledge management initiative (The Delphi Group, 1999). As a result, a key phase within this project was to conduct face-to-face, semi-structured interviews with each of the twenty members of staff in the tax department to form the basis of the knowledge audit. These interviews were carried out to further increase the focus and acquire more detailed information from each individual.

It was decided to use semi-structured interviews in order to keep to the basic structure of the six areas of the KM process model, but would allow a degree of flexibility and give individuals the opportunity to add anything they felt to be relevant. By this stage discussions had taken place with representatives from the tax department relating to the information gathered so far from the performance measurement grid. As a consequence, it was agreed that the main focus should be on two of the six areas of activity detailed in the KM process model - Storage and Maintenance and Dissemination and Transfer - as these appeared to be the areas of concern which were emerging from the measurement criteria stage.

The interviews aimed to elaborate on data acquired from the initial knowledge management questionnaire and the measurement criteria. While these methodologies focused on the processes and how they were performed, the interviews aimed to

provide an examination of content within these processes. As the interviews were semi-structured they followed the outline below:

- Role within the department
- What types of knowledge are used, preferred formats
- Where individuals get knowledge, whether these sources are internal or external
- Who does the individual acquire knowledge from and pass it on to, the knowledge which would be lost if a team member left, specify team member
- How is the knowledge used, how is knowledge transferred, stored, acquired etc
- When - how often do individuals share, store, use and acquire knowledge, when does this take place
- Why do individuals share, store, use and acquire knowledge, how does this relate to the main areas of tax savings, tax returns and tax exposures
- What types of barriers/problems exist
- Future Improvements - suggested improvements

All twenty employees attended the individual interviews that were taped with each individual's permission so that they could be subsequently transcribed. In general individuals were very willing to contribute during the interviews and a great deal of valuable information was gathered. The duration of the interviews varied from around 20 minutes to 1 hour 45 minutes reflecting the various roles within the department and how they related to knowledge use.

The interview data seemed to reinforce the results of the initial questionnaire conducted during the preliminary phase of the project and suggest that although there

was a great deal of tacit and explicit knowledge available within the department, very few people knew where to find it. One respondent felt that this was indeed the case:

*“I don’t always know who to speak to or where to go for a specific piece of knowledge. So what then happens is that I talk to someone who then says go to talk to someone else then I go to somebody else who may or may not know. So I may have to go to five people before I get the right knowledge or information”.*

This was also reiterated by another respondent:

*“most of the time ... you are not really sure what you are looking for. You are wading through an enormous amount of things just trying to gather lots of information/knowledge just to see if that is really what you need”.*

It also reinforced previous findings that suggested certain people were seen as main sources of knowledge. This suggested that there were at least three members of staff that held the majority of knowledge within the tax department indeed several respondents felt that:

*“there is too much knowledge in people’s head within the department”.*

The interview data also confirmed findings from the questionnaire which seemed to suggest that each individual within the department had his/her own way of carry out

each process and indeed also indicated varying degrees of content within these processes.

The analysis process brought together all the information gathered throughout the audit process: responses to the initial questionnaire; the performance measurement radar diagrams; and the interview transcriptions for each individual. For the purposes of this project no real comparison between individuals was required, but while focusing on the responses of each individual, it was evident that there was a degree of overlap particularly with data from the initial questionnaire and the interviews. Similar questions were asked in both the initial questionnaire and the interview and as such similar responses were therefore evident in both methods for the majority of respondents. Although differences and anomalies did occur in some of the data, the majority produced similar responses which helped to reinforce the findings from the initial questionnaire. For instance, when asked to indicate a specific member of the team whose knowledge would be missed if he/she left suddenly, three employees were chosen depending on the section in which the respondents worked. Interestingly however, one individual mentioned by several respondents as being the main source of knowledge and someone they went to acquire and share knowledge felt that his/her performance could improve and indeed scored his/her performance lower than the department's performance. With the exception of Application and Exploitation where he/she believed both individually and departmentally that this activity was embedded in working practice, he/she perceived his/her performance to be less embedded than that of the department as a whole. While several members of the team felt he/she was the benchmark to aspire

to, this individual felt that personally improvements were required to match the performance of the department.

Clearly the idea that perceptions relating to process performance and how well or badly things were done by individuals or the department did differ from individual to individual. Several factors appeared to influence these perceptions and included: the background of the individual and whether or not he/she had worked in other organisations or other departments of this particular company; his/her role within the department; as well as the length of time he/she had spent in the tax department.

While overlap was evident in general there was an increase in focus from the questionnaires to the interviews, drilling down to get a more detailed picture which took the form of the current situation table. There were two parts to the analysis: the first gave a description of the current situation and the second put forward suggestions for improvements. The current situation and suggested improvements were included under each of the six themes for every member of staff. These suggestions were derived both from the information provided by individuals and from CKM's experience of KM in practice in other organisations. Suggestions varied but included:

- Document procedures and processes
- Standardise procedures and processes
- Make knowledge available from a centralised point
- Capture precedent and lessons learned and store in centralised database



This analysis served to provide a personally tailored plan of how each individual's knowledge management activity might progress in the next stage of the project and allow development of the knowledge maps.

#### **Phase 4. Development of Knowledge Maps**

Based on the information gathered from the staff, this stage consisted of the development of a knowledge map for each member of staff (see Figure 3). Once the interview findings were collated and analysed the information along with the other findings was then translated into a knowledge map. The map is a pictorial representation of the knowledge flows, bottlenecks and sources within the organisation (Grey, 1999).

Due to the detail of each map it was decided that one map representing the knowledge of all individuals within the department would not be appropriate. The worry was that if the map was too complex the individual and the department as a whole would not gain any value. Once this decision was made and after several attempts a suitable map template was produced which would form the basis of each individual map. The current situation was then represented pictorially in an individual knowledge map (see Figure 3).

Although the development of the maps was time consuming, from the analysis of all the information gathered it was possible to show by means of the knowledge map where knowledge was acquired, stored, applied and disseminated by each individual. For instance, Example 1, Figure 3 shows that this individual acquires corporation tax

knowledge by reading tax cases, Inland Revenue Manuals and Bland as well as gaining knowledge by receiving e-mails from colleagues. The individual then disseminates this knowledge either verbally or by e-mail to other colleagues and the Inland Revenue. He/she then stores this knowledge of corporation tax in hardcopy files, the H: and S: drives, a relevant database and in his/her own head. Storage preference is indicated from left to right, therefore this individual stores the majority of knowledge in his/her head. This map also indicates the flow for both the knowledge of statues and petroleum revenue tax and as such provides a pictorial representation of this individual's knowledge.

Example 2, Figure 3 also indicates that this individual acquires knowledge from a variety of sources and then disseminates each type of knowledge to people who ask for knowledge and business clients. As with the previous example, this individual stores the majority of knowledge in his/her own head. In comparing these two knowledge maps it is evident that each individual has different preferences to sharing and transferring knowledge. Indeed, all twenty maps indicated that in general each individual used different types of knowledge, acquired knowledge from different sources, shared knowledge with different people and stored the knowledge in different ways. These maps also served to illustrate the flow of knowledge and highlight any bottlenecks that may be hindering this, and identified consequent areas for improvement.

Take in Figure 3

Once all the maps were completed each individual within the department was provided with a personal information pack. This included each individual's interview transcript, his/her current situation table, radar diagrams and their own unique knowledge map. This pack provided information to allow individuals to assess their own current situation and address any improvements required, as well as provide preparation material for the project feedback event.

### **Phase 5.                    The Feedback Event**

In order to introduce knowledge management successfully, Wiig suggests that an organisation should “create an *environment* of trust, ethical behavior, mutual respect, support, and open communication about individual employees' functions, roles, and importance of contribution” (Wiig, 1999). As such it was seen as important to keep staff aware of project progress and developments. As the project effectively aimed to potentially change the behaviour of individuals, it was important to inform them of all stages of the project. The feedback event therefore aimed to mark the end of the knowledge audit and map stages of the project and also inform the staff from the tax department of the project progress and to recap on the work conducted to date. The event consisted of three components:

Part 1 - Audit and Map Process

Part 2 - Audit and Map Conclusions

Part 3 - Audit and Map Recommendations

The first section informed the staff of the audit process and provided them with the reasoning behind the use of certain methodology. The audit process was illustrated by a process map which explained how the different stages fitted together. In addition two volunteers from the audience were asked to provide their feedback of the process and the opinion with regard to the effectiveness. This allowed for more honest feedback and also helped to learn from mistakes and inform future knowledge audits.

The second section provided the department with a summary of the audit conclusions. During this session each individual was also asked to provide feedback relating to the knowledge management and the project in the form of a small questionnaire. This would allow comparison with the questionnaire distributed during the learning day event (see Figure 4).

Take in Figure 4

The results confirmed that over the last four months the individuals' understanding of the concept, the benefits and their role within the project had increased. Indeed 87% offered 'buy in' to the Knowledge Management project.

The third session addressed recommended improvements which staff would be expected to consider. A number of themes and areas for improvement had been identified through the feedback sessions during the learning day event and the survey carried out prior to the event. This again was reiterated by the data collated from the semi-structured interviews. Recurring issues included:

- Not knowing where to look for appropriate knowledge
- Lack of documented and defined business procedures
- Little or no knowledge quality control
- Constant change in tax legislation
- Inefficient filing system

Improvements detailed in this session were developed by management of the tax department based on the recommendations made by CKM and consisted of:

- Improve access and availability of current knowledge (best practice and next practice)
- Establish a more systematic approach to learn new knowledge
- Design and establish ‘corporate memory’ to store knowledge
- Improve quality of knowledge

This session also included group work in order to assist in the development of the implementation plan for the following year. With the suggested improvements in mind, the groups were asked to consider what type of initiatives the plan should include, when these recommendations/initiatives should be put in place, and who should be responsible for them. Suggestions included:

- Capture lessons learned in order to establish ‘corporate memory’
- Signposting to improve access and availability of current knowledge
- Mentoring programmes to improve the acquisition and learning of new knowledge

It was felt that providing employees with an opportunity to aid in the development of their KM strategy would help to encourage their involvement and motivation during the implementation stage of the project. The feedback was then collated and considered in relation to the development of the implementation plan.

Feedback with regard to the success of the event was encouraging. Indeed the employees as a whole seemed to appreciate their involvement in the implementation plan group work, suggesting that the more involvement they had, the more interested they were.

#### **Phase 6. Implementation Plan Development**

CKM acted as a facilitator at this stage, and helped the department to determine their own strategy. Throughout the duration of the project and in particular the feedback event, suggestions and feedback from individuals were noted. These ideas were then collated and examined thoroughly and became the starting point in developing the implementation plan. These suggestions and ideas were prioritised from 'essential', 'beneficial', 'nice to have' or 'not relevant' under the following two categories: improving existing ways of working; and establishing new ways of working. This in turn helped to produce a KM activities framework which was developed collaboratively with staff within the department which again utilised the six knowledge management activities as a structure.

This provided desirable outcomes for each activity, as well as project and behavioural expectations relating to individuals and teams within the department. It

also aimed to create a set of normalised behaviours relating to each knowledge process. Under each process, expectations were provided to outline desired improvements and implementations. Such expectations included greater use made of the organisation's Intranet as a gateway to relevant information, which would assist in sharing new and existing knowledge, and the development of a 'yellow pages' service which would be made available via the organisation's Intranet. An additional benefit of the activities framework was that it could also act as a monitoring tool which could be used within performance appraisals.

## **Phase 7. Implementation**

Various implementations based on the implementation plan and the improvements detailed during the Feedback Event are currently underway within the department.

The plan consists of:

- The introduction of Yellow Pages, signposting and a taxonomy to improve access and availability of current knowledge
- Establishing induction training, exit interviews and coaching/mentoring programs to improve the acquisition and learning of new knowledge
- The development of lessons learned, precedents, and procedures in order to establish 'corporate memory' to store knowledge
- The introduction of mapping processes, sub-processes, tasks and activities as well as the development of a best practice system which outlines objectives, how it is done, evidence it works and the benefits and risks to improve the quality of the knowledge within the tax department

Having deliberately taken an educational perspective on the project by educating employees regarding KM, CKM's input to this stage of the project has been minimal, although it continues to act in an advisory capacity. The employees within the department now have the necessary knowledge to improve existing processes and establish new ways of doing things in order to gain savings and overcome existing problems.

### **Difficulties Encountered during the Project**

Despite a vast amount of theoretical material being available on knowledge management, along with a surfeit of organisational case studies, there seemed to be a lack of literature in the practicalities of carrying out such projects. Mainly due to the lack of literature to refer to during each stage of the project, difficulties generally arose in designing the tools for this project. In fact the main complexity related to the knowledge map stage. It was difficult to visualise how the knowledge map should be presented in pictorial form which would identify flows, bottlenecks, resources available and as such assist in identifying recommendations or strategies. It took several attempts to produce a knowledge map template which the Centre and the management of the department were satisfied with and that this would meet the aim of this stage and the project as a whole. The lack of time available prohibited the development of a large, complex, departmental map and it is anticipated that in the future both individual and departmental maps will be produced.

A further difficulty related to the different perceptions and attitudes of the employees within the department. The department consisted of several employees with different



roles, backgrounds and at different stages of their careers. This meant that each had a fairly different perspective on what the department was doing well and/or badly and what it needed to do in relation to knowledge management. These factors therefore influenced their perceptions of the performance and content of knowledge processes.

It was also evident through the use of different methodologies that some employees were not consistent in their responses. When comparisons were made between the responses of the initial questionnaire and the interviews, it was evident that a minority of employees had either added or excluded answers and this data did not correspond with the findings of the initial questionnaire. For example, when asked to indicate the methods of acquiring knowledge several respondents gave slightly different answers in the initial questionnaire to the responses of the interviews. Although this was not a difficulty as such, it did increase the time allocated to analysing the data in order to produce the knowledge maps which resulted, where appropriate, in all answers being included in the individual maps. Whether these inconsistencies were due to the lack of knowledge of the project in the beginning it is not clear, however it did affect the project deadlines.

In relation to the attitudes of the staff members towards the project some resistance was evident during the initial learning event. After the event, CKM were aware that some members of the department had little experience of knowledge management or this type of project. As such CKM made a conscious effort to inform the department as well as the senior management of each phase of the project. It is clear from the

comparisons between the attitude surveys in both learning days that this approach had encouraged enthusiasm and understanding.

Although this project had a very positive and successful conclusion a few difficulties and complications were encountered during the project. That being said little effort was required to overcome these difficulties in order to proceed to the next phase of the project.

## **Findings**

It was apparent from initial reviews of existing literature during the preliminary phase of the project that very little literature existed on actually carrying out a knowledge audit and map. As a result, CKM developed its own approach to be developed with the use of the six processes in the KM process model. Although successful for this particular project, it should not be perceived as the 'correct' way to conduct an auditing and mapping process, rather just one possible approach which may be adapted to suit the needs of other departments and organisations. In all KM implementation projects, the project and tools used must reflect the culture and operations of the organisations within which it is applied.

This project has shown that those affected by the implementations resulting from the knowledge audit and map must be kept well informed at all times, and involved closely within the project, in order to establish a sense of ownership. By applying an educational perspective, the employees were able to develop a greater understanding

of the concept of KM, as well as its potential benefits. However, feedback suggested that this may have been too 'academic' an approach for some, and consequently is a consideration that needs to be handled with some delicacy. A light-hearted approach to the feedback event and to the process as a whole arguably proved to be more useful. This encouraged contributions from individuals and helped to obtain 'buy in', by staff feeling they were not threatened by the process. More generally, it was also evident that a number of stages and tools assist in undertaking a successful knowledge audit and map, and that the actual knowledge audit is only one part of a larger ongoing process. In effect, the knowledge audit is only the starting point for any ongoing KM-related activity within an organisation.

It is evident from the process that simple and straightforward improvement solutions can be put in place in order to begin to establish a culture of knowledge management at a departmental level. Lastly, it is important to note that any process undertaken (as well as any consequent solution identified) must take into consideration the unique behaviour of individuals, and aim to provide an atmosphere which empowers individuals rather than seeking to control their behaviour.

## References

- Delong, J., B., and Summers, L., H. 2001. The New Economy: Background, Questions, and Speculations. [http://www.j-bradford-delong.net/Econ\\_Articles/Summers\\_New\\_Economy\\_2001.html](http://www.j-bradford-delong.net/Econ_Articles/Summers_New_Economy_2001.html) [17 October 2002]
- The Delphi Group. 1999. Why do a knowledge audit? *Knowledge Management*, December 2000. <http://www.destinationkm.com/print/default.asp?ArticleID=633> [14 April 2003]
- Frappaolo, C. 2000. What's Your Knowledge IQ? *Intelligent KM*, October 2002. [http://www.intelligentkm.com/feature/08/feat1.shtml?form\\_page=bi](http://www.intelligentkm.com/feature/08/feat1.shtml?form_page=bi) [27 January 2003]
- Grey, D. 1999. Knowledge Mapping: A Practical Overview. <http://www.smithweaversmith.com/knowledg2.htm> [12 December 2002]
- Hidlebrand, C. 1995. Information Mapping: Guiding Principles. *CIO*, July 1995. [http://www.cio.com/archive/070195\\_map\\_content.html](http://www.cio.com/archive/070195_map_content.html) [14 April 2003]
- Liebowitz, J. 2000. *Building Organizational Intelligence: A Knowledge Management Primer*; London: CRC Press.
- Liebowitz, J., Rubenstein-Montano, B., McCaw, D., Buchwalter, J., and Browning, C. 1999. The Knowledge Audit. <http://userpages.umbc.edu/~buchwalt/papers/KMAudit.htm> [19 November 2002]
- McElroy, M., (2001). Second generation knowledge management. [http://www.macroinnovation.com/images/McElroy\\_On\\_2nd\\_GenKM.pdf](http://www.macroinnovation.com/images/McElroy_On_2nd_GenKM.pdf) [14 January 2003]
- National Electronic Library Health. 2001. Conducting a knowledge audit. [http://www.nelh.nhs.uk/knowledge\\_management/km2/audit\\_toolkit.asp](http://www.nelh.nhs.uk/knowledge_management/km2/audit_toolkit.asp) [30 September 2003]
- O'Dell, C. 1996. In Liebowitz, J., (ed). 1999. *Knowledge Management Handbook*; London: CRC Press.
- Perkmann, M. 2002. Measuring knowledge value? Evaluating the impact of knowledge projects. [http://www.ki-network.org/downloads/knowledge\\_value\\_b7.pdf](http://www.ki-network.org/downloads/knowledge_value_b7.pdf) [2 October 2003]
- Skyrme, D. 2002. Knowledge Audit. <http://www.skyrme.com/services/kmaudit.htm> [7 October 2003]
- Skyrme, D. 1998. Knowledge Management Solutions. <http://www.skyrme.com/pubs/acm0398.doc> [14 April 2003]

- Speel, P., Shadbolt, N., de Vries, W., Hein van Dam, P., and O'Hara, K. 1999. Knowledge Mapping for Industrial Purposes. <http://sern.ucalgary.ca/KSI/KAW/KAW99/papers/Speel1/> [11 April 2003]
- Stevens, L. 2000. Knowing what your company knows. *Knowledge Management Magazine*, 21 November 2000. <http://www.destinationkm.com/articles/default.asp?ArticleID=6138&Keywords=larry++AND+stevens> [10 December 2002]
- Vail, E. 1999. Mapping organizational knowledge. *Knowledge Management Review*, May/June 1999.
- Wexler, M. 2001. The who, what and why of knowledge mapping. *Journal of Knowledge Management*, 5(3), pp.249-263.
- Wiig, K., M. 1993. In Liebowitz, J., (ed). 1999. *Knowledge Management Handbook*; London: CRC Press.
- Wiig, K., M. 1997. Knowledge management: where did it come from and where will it go? *Expert Systems with Applications*, Vol. 14, Fall 1997.
- Wiig, K., M. 2000. In Liebowitz, J., Rubenstein-Montano, B., McCaw, D., Buchwalter, J., and Browning, C. 1999. The Knowledge Audit. <http://userpages.umbc.edu/~buchwalt/papers/KMaudit.htm> [19 November 2002]
- Wiig, K., M. 1999. Knowledge management and enterprise effectiveness. *Intelligence in Industry*, Issue 1, 1999. <http://www.unicom.co.uk/3in/issue1/2.Asp> [27 January 2003]