Knowledge and information management in the water and sanitation sector:

A hard nut to crack

Thematic Overview Paper 14
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Please note that the TOPs are a web-based series. However, we feel that those who don't have access to the Internet should be able to benefit from the TOPs as well. This is why we have also made them available as paper versions.

This TOP is published as a PDF on IRC's website. A summary is made available as web text and will give you an idea of what the TOP is about before downloading the whole document.

Edited by: Bill McCann

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TOPs are intended as dossiers to meet the needs of water, sanitation and health professionals in the South and the North, working for national and local government, NGOs, community-based organisations, resource centres, private sector firms, UN agencies and multilateral or bilateral support agencies.

How to make the most of this TOP

This TOP explores current thinking about knowledge management (KM), information sharing and learning in relation to the sector. It includes an overview of the main principles based on a scan of worldwide experiences and views of leading practitioners. It does not provide an in-depth analysis, but much more a quick overview that helps readers to become acquainted with the issue. Throughout the document links are provided to more detailed explanations and documented experiences to guide the reader to further reading if they want to proceed with the topic.

For readers who are interested in a specific area you may first want to go to Section 1.5 which gives a brief annotation of the different sections of this TOP, or you can search for a specific keyword using the binocular icon in the PDF toolbar.

For those readers who want to spend some more time on the topic, you can freely download and print the PDF file, read it and possibly share it with others. If you use the material extensively, for example in training sessions, or if you have comments, we would very much like to know. Please write to Sascha de Graaf (graaf@irc.nl).

Target audience

We wrote this TOP primarily for people working in the water and sanitation sector, including individuals who want to understand more about the way they acquire knowledge and manage it, trainers who want to find out more about knowledge sharing and people responsible for decision-making on the introduction of technology to enhance KM in their organisation. The content is sufficiently generic however to be of use to people working in other sectors.

1.   Introduction

This section looks at the growing interest in knowledge management (KM) and at some of the confusion and conflicting perceptions that can be associated with the subject. It briefly discusses the authors' perspective on KM and outlines some crucial issues that need to be taken into account before starting a KM initiative. The section concludes with a brief overview of the contents of the TOP.

1.1   Growing interest in knowledge management

Interest in KM in the water and sanitation sector has been growing rapidly over the past few years. In 1996, the World Bank (http://www.worldbank.org) launched its initiative to become the Knowledge Bank (Carayannis and Laporte, 2002). Since then, knowledge has become more important in the sector although many development organisations claim they practised KM before it was labelled as such.

The growing interest in KM seems to be related to the following factors:

- Our society is changing from a traditional economy, based on production factors - land, labour and capital, to **a knowledge-based economy**, where knowledge is becoming the primary production factor on which competitive advantage rests. In the early nineties private companies started to experiment with what Erick Sveiby (http://www.sveiby.com) called 'intellectual capital[1]', as opposed to the traditional resources. "Intellectual capital, the untapped and unmapped knowledge of an organisation has become the company's greatest competitive weapon. It is found in the talent of the people who work there, the loyalty of the customers it serves and learns from, the value of its brands, copyrights, patents and other intellectual properties; the collective knowledge embedded in its cultures, systems, management techniques and history" (Stewart, 1997). One of the first organisations to strategically capitalise on intellectual capital was the Swedish insurance company Skandia (www.skandia.com).
- The interest in KM is also stimulated by the quickly **growing technical possibilities**. Technologies continue to evolve rapidly, especially in the areas of collaboration, search engines, data base development and data mining. This evolution, combined with access to Web-based technologies, is "enabling" KM (Binney, 2001). Email made the web of connected computers useful and the World Wide Web (founder Timothy Beners-Lee) revolutionised the access to and dissemination of information.
- People no longer stay a life time in an organisation. **Job hopping** is more common, exposing an organisation to the risk of losing intellectual capital. Equally, **job rotation** requires a better understanding of KM.
- The **overdose of information** (on the Internet) requires a KM strategy to maximise benefits and reduce burdens.

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[1] For a more in-depth historical overview of Intellectual Capital Management, see http://www.sveiby.com/articles/icmmovement.htm.

1.2   Confusing and conflicting perceptions

The growing interest in KM has been accompanied by a vast number of articles and publications on the topic. Many different views have been presented, leaving a confusing picture. This has arisen because the writers have approached the subject from different perspectives, influenced by different applications or different backgrounds.

Is KM just a way of keeping track of the information that is being produced? Is it an essential component of human resource development? Is it just a fad, promoted by consultancy companies, that will fade away (Wilson, 2002)? Or is the effective implementation of a sound KM strategy a mandatory condition for success for organisations as they enter the era of the knowledge economy?

Whereas answers to these questions may differ according to different experts, they make clear that it is worthwhile to look into KM, taking into account its many different elements, the most important of which we have tried to address in this paper.

1.3   Our perspective on knowledge management

From our perspective, KM is about:
*   **Strategy**, defining the direction you want to take
*   **People**, the 'knowers' and learners who make or break the process
*   **Processes**, the way KM is organised
*   **Technology**, the enabling **tools** that facilitate storage, handling and sharing of data and information.

Apart from technology, there are other factors that may enable or hamper KM (**enabling factors and barriers**), such as culture, structure (of processes), skills, leadership, management styles, and policies.

This perspective on KM will be the basis for sections 3 to 8, where we will explain different elements in further detail.

1.4   A crucial question

"We should do something on KM" is a remark often heard. KM is sometimes presented as *the* answer to many problems, ranging from poor internal communication to failing product development. But there is one crucial question that you should ask yourself before starting with any KM initiative:

"Knowledge to do what?"

You need a clear strategy first, for yourself, for your organisation or network. To define that strategy you have to raise the following questions: What is it exactly that you need knowledge for? How will it help you achieve your (personal/organisational/network) goals?

Many organisations have invested a lot in people and technologies to little effect because they did not pose these crucial questions. It only makes sense to invest after you have answered these questions for yourself, your programme or organisation. In this respect, the lessons from the pioneers[2] should be kept in mind:

- Enthusiastic champions are needed and have to be found
- Build KM initiative(s) on existing core competences
- The KM initiative should address an urgent strategic imperative
- Firm commitment from the top is needed for a successful KM initiative/intervention
- Early quick victories from KM initiatives neutralise the nay-Sayers

1.5   Annotated contents of this TOP

Below is a brief annotation of what is covered in this TOP:

- **Concepts and definitions,** clarifying key issues related to KM such as the difference between data, information and knowledge; tacit and explicit knowledge; information management (IM) and KM.
- **Strategy**. Links KM to vision, mission, goals, structure, policies and resources of an organisation.
- **People.** Deals with the way people learn, attitudes, skills, experiences, mental models and training; and briefly discusses some perspectives on where the responsibility for KM lies.
- **Processes.** Discusses the main processes that are involved in KM, such as developing, storing, sharing, applying and maintaining knowledge.
- **Technology.** Presents an overview of the different types of enabling technologies that are available for KM.
- **Enabling factors and barriers.** Discusses culture (learning organisations, sharing and innovation), leadership, policies and measurement in relation to KM.
- **Improving knowledge management.** Discusses – in a more sector specific way – what you can do to improve KM. It distinguishes three levels: the personal level, the organisational level and the network (sector/inter-agency).
- **Case studies**: presents examples on the application of KM, building on the experience initiated at the 6th Water Information Summit.
- **TOP resources:**
    - TOP articles, books, papers
    - TOP models and tools
    - TOP websites
    - TOP contacts
    - TOP references

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[2] See http://www.sveiby.com/articles/Kworkerdvlpment.htm

2. Concepts and definitions

This section presents definitions of the most important concepts involved in KM. It starts with a discussion about data and information. Thereafter it discusses different definitions of knowledge, clarifying issues such as tacit, explicit and indigenous knowledge. The section ends with a look at two key issues that are very different but in fact intrinsically related: IM and KM.

2.1 Information

Information is more than **data**, which are registers of facts from events or transactions without context. By structuring data using our mental framework and subjectivity to explain or express something, we convert data into **information**, a set of data with relevance and purpose. This provides answers to "who", "what", "where", and "when" questions. For instance, my neighbour who works as a police officer would consider a list with specifications for a specific type of hand pump as data. It has no direct relevance for her as it does not match her context or purpose. For me, on the other hand, needing to write a report on why this particular type of hand pump is not used anymore, the list is information - it may contribute to an explanation of the failure of the hand pump.

Information has the great advantage of being a resource that does not deplete when it is shared. By downloading a publication from the Internet you obtain your own copy, but the information is not depleted, it is still available to others.

Information always needs a carrier. It takes a user to turn it into action and this requires the user to consider it to be useful. By acting, the user becomes an intermediary in the information sharing process and may as well become a producer of information (Engel, P. in Röling et al., 1994). It is important to encourage this process as it may help to generate a dialogue between the actors that have been leading the sector (government, international organizations) and the practitioners and users, who often are the unheard voices.

Information can exist separately from people and has different forms. These forms include: written text (in publications, on the internet etc.), audio materials (radio, tape recorder), stories, visual expressions (pictures, drawings, drama, videos, films etc.), multi-media etc., but also smell, taste and touch.

2.2 Knowledge

"Knowledge is a fluid mix of framed expertise, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates from and is applied in the minds of "knowers". In organisations it often becomes embedded not only in documents or repositories but also in organisational routines, processes, practices and norms" (Davenport & Prusak, 1998).

This is a comprehensive definition of knowledge, among the many that can be found in the literature on KM. The gist of most definitions is that knowledge is a personal capacity to act. It is clearly more than information (Box 1). When we interpret, understand and apply the information we receive, to reflect and act upon and to add it to our previous knowledge, we create new knowledge. Ackhoff (1989) refers to **knowledge** as the application of data and information, answering "how" questions. He further distinguishes **understanding**, the appreciation of the "why" and **wisdom**, being evaluated understanding.

Knowledge requires a 'knower' and these knowers - consciously or sub-consciously - make a choice to share their knowledge. Knowledge sharing is going on in organisations all the time. Many people, for example, help colleagues and others, individually or in informal communities of practice, sharing what they know. Unfortunately, the opposite can also happen. Some people do not want to share their knowledge. They hoard it, to the detriment of the greater cause.

Box 1: What is Knowledge?

Knowledge is understanding the why, what, how, who, when and where relative to taking some action. It is the product of organisation and reasoning applied to raw data.

Tacit knowledge as first defined by Polanyi, is personal hidden knowledge, even from the consciousness of the knower, which cannot be "captured" but only demonstrated through our expressible knowledge and through our acts.

Nonaka and Takeuchi expanded this concept by including previously unexpressed, but expressible knowledge (information), which Wilson calls **implicit knowledge**, the part of tacit knowledge that can be shared.

Explicit knowledge (information) is that component that is codified and transmitted in systematic and formal languages, for example documents, databases, webs, emails, etc.

Based on Polanyi, 1958; Nonaka and Takeuchi, 1995; Davenport and Prusak, 1998; Wilson 2002.

2.3 Tacit, implicit and explicit knowledge

Tacit knowledge is strictly related to a person. It can be clear or confusing, and often cannot be expressed in a precise way, yet it is crucial in decision making and in our perception of the world. For example, if we say the seats in the bus are not very comfortable, a person used to sitting on a wooden bench will understand this differently from a person used to sitting on a sofa. A proverb that may help to understand what tacit knowledge is about: You cannot learn cycling from a book.

Tacit knowledge concerns the process that goes on in our mind and body. It is our filter of the information we receive through our senses. Every person is continuously exposed to a wealth of information which he or she "filters" on the basis of his/her personal knowledge

base. What is relevant for one person may be totally irrelevant to another. This nicely explains the human tendency to "hear what we want to hear".

The term tacit knowledge was first used by Polanyi (1958), referring to knowledge hidden even from the knower. He used the phrase 'We know more than we can tell'. Hence this is inexpressible knowledge. Nonaka (1995) took this concept, but actually changed it by including both inexpressible knowledge and previously unexpressed, but expressible knowledge.

Knowledge can be transformed from tacit to **explicit knowledge** and vice-versa. (Nonaka and Takeuchi, 1995). For example, student drivers need to be taught where the gears are, but need to make this explicit knowledge tacit before they can become accomplished drivers—shifting the gears without thought in response to the sound of the engine and the feel of the car (Gorman 2002).

To illustrate how tacit knowledge can be transformed to explicit knowledge and vice-versa, Nonaka and Takeuchi developed the figure below.
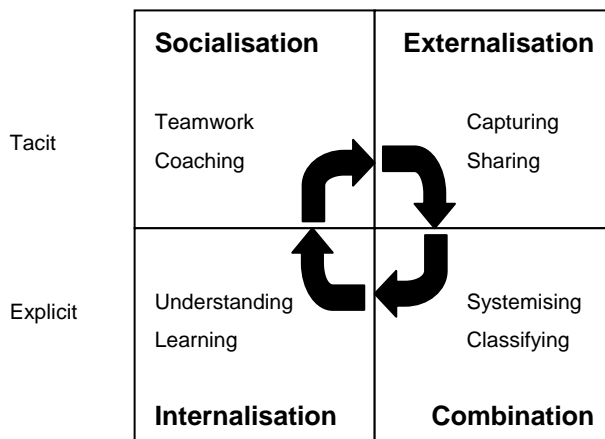
Figure 1. The relationship between tacit and explicit knowledge
Source: The Knowledge Creating Company", Nonaka and Takeuchi (1995)

Nonaka and Takeuchi (1995), however, also state that there are limits to the extent to which tacit knowledge can be transformed into explicit knowledge, thus accepting the existence of inexpressible knowledge. Wilson (2002) (http://InformationR.net/ir/8-1/paper144.html) makes this more explicit by indicating that the part of tacit knowledge that consists of previously unexpressed, but expressible knowledge may be better termed **implicit knowledge**.

In engineering training considerable attention is given to rational assessment of alternatives. Yet in practice our tacit knowledge may have a considerable influence on this

selection process, without us knowing it. Perceptions of people differ and so two persons applying rational decision making processes may reach different conclusions.

Snowdon (2001, 2002) (http://www.kwork.org/Resources/narrative.pdf) provides interesting food for thought by indicating that: "Humans, individually and collectively, work on the basis of contextual pattern recognition, often at a non-conscious level". He argues that decisions are not made on the basis of a rational evaluation of carefully considered alternatives, but through a first fit pattern matching with past experience. Those patterns are ingrained, based on our own past experience and the collective experience of our culture, often communicated through stories – national and organisational.

2.4   Indigenous knowledge

In the context of the water and sanitation sector it is useful to mention the term indigenous knowledge, also referred to as local or traditional knowledge. The growing interest in this knowledge is very much related to the drive towards more community based approaches. See Box 2 for an example. Some useful definitions are:

"Indigenous knowledge is the local knowledge that is unique to a given culture or society. It is the basis for local-level decision-making in agriculture, health care, food preparation, education, natural resource management, and a host of other activities in rural communities." (http://www.nuffic.nl/ik-pages/)

"Indigenous knowledge is the knowledge that people, in a given community, have developed over time, and continue to develop. It is based on experience, often tested over centuries of use, adapted to local culture and environment, dynamic and changing." (http://www.unesco.org/most/bpindi.htm).

The World Bank (http://www.worldbank.org/afr/ik/) website mentions the following characteristics of indigenous knowledge:

"Indigenous Knowledge (IK) is local knowledge
IK is unique to every culture or society
IK is the basis for local-level decision making in:
- *agriculture,*
- *health care,*
- *food preparation,*
- *education,*
- *natural-resource management, and*
- *a host of other activities in communities.*

IK provides problem solving strategies for communities
IK is commonly held by communities rather than individuals
IK is tacit knowledge and therefore difficult to codify, it is embedded in community practices, institutions, relationships and rituals"

It is important to take this knowledge into account when trying to find solutions to identified problems.

Box 2. The wisdom of the elderly; water and termite hills

"I admire your courage. You are doing everything in your power to give us water, but may I give you some advice? [...] The water runs beneath the earth in small brooks. We cannot see these little brooks beneath the earth, but they exist. I have noticed that in the dry season the termite hills continue to grow. And termites need a lot of water. They look for water in the brooks deep down in the earth. I know the location of the termite hills in the fields around the village. Put your machine there. You will find water."

This story was told by an old man from a village close to Ouaninou in the Western part of Ivory Coast, to the head of a well drilling team that had drilled unsuccessfully for water for three days. The following day the team found water at the location indicated by the old man. (Clavreul, J.Y. in: Graaf, S, de (ed), 2003 Water Stories http://www.irc.nl/page/6004)

2.5   Information management

Looking at the literature it is clear that information management (IM) is a broad subject area with a long history. It is about managing recorded information (explicit knowledge), and is particularly concerned with access to information, its handling, codification, storage and delivery. So it deals with issues such as data bases, abstracts, publications, management information and good practices.

Information, as well as information resources such as: libraries, papers in a journal e-mail messages in a folder but also a data base with experts (yellow pages) can be managed and can contribute to becoming more effective and efficient. A thesaurus, such as the InterWATER thesaurus (http://www.irc.nl/interwater) is a key tool as it provides the common (shared) terminology to codify the information.

It should not be overlooked that the most important aspect is that the information needs to be used. Hence the management of information concerns the management of the information process and not only the product. Every actor in the process is at the same time a user, an intermediary and a producer of information. In this case a range of factors, including costs and benefits, determine the borders of the information exchange (Engel, P. in Röling et all, 1994).

Story telling

An area of growing interest is the management of stories, because "we always know more than we can say, and we always will say more than we can write down" (Snowden, 2001). Some people argue that story telling is more about KM than about IM, but we have

included it here because stories can be captured on tape. This makes it possible to bring them together in a narrative database that allows abstract searches by archetypes, themes, intention, emotional level and perspective.

Snowdon indicates that "best practices", often hold fewer lessons than failures. Story telling may help to bring about more lessons from mistakes and in that it is interesting to remember that "we have to learn from the mistakes of others as we do not have enough time to make them all ourselves".

Story telling is an important part of the oral tradition that still exists in the developing world. Unfortunately it is a dying tradition in many countries, thus loosing the potential for many valuable lessons.

As an instrument, story telling can be used to record the impact of KM interventions. Just ask participants in a KM workshop to tell a story about themselves and what has changed since the KM intervention took place. Also in the organisational realm, where KM interventions aim to invoke organisational change, asking for stories on change can help to record impact. For example, a lot of annual reports nowadays contain stories and/or quotes on impact.

For more information on organisational story telling, see for example:
http://www.stevedenning.com/ or http://www.creatingthe21stcentury.org/.

2.6   Knowledge management

The IT-track and the people track
Sveiby (2001), one of the founding fathers of the idea of KM, notes that it consists of two 'tracks': the *IT- track*, which is IM, and the *people track,* which is the management of people. However, Wilson's (2002) (http://InformationR.net/ir/8-1/paper144.html) critical review of a large number of references that included the term KM and a brief analysis of consulted web sites revealed that many authors deal only with the information (*IT*) track. They use the term knowledge as a synonym for information.

The human dimension
Wheatly (2001) indicates that a lot of people think of and talk about knowledge as a thing. We want to "capture" knowledge; to inventory it; to push it into or pull it out from people. David Skyrme (cited in Richardson, 2001) confirms this by indicating that in both Britain and the U.S., a common image of KM is of "decanting the human capital into the structural capital of an organisation", i.e. capturing part of the tacit knowledge into accessible products 'owned' by the organisation.

Wheatly indicates that: "We need to abandon this language and, more importantly, the beliefs that engender it. We need to look at knowledge - its creation, transfer, and very nature - with new eyes. As we rethink what we know about knowledge and how we handle

the challenges of knowledge in organisations, our most important work is to pay serious attention to what we always want to ignore: the human dimension".

Can knowledge be managed?
The answer is straight forward: "knowledge (i.e. what we know) can never be managed, except by the individual knower and then, only imperfectly (Wilson 2002). Knowledge can only be volunteered.

So in the strict sense KM is nonsense, as Wilson (ibid) indicates, unless we take a practical stand and define it as "managing information and knowledgeable people", thus making it more than IM. It is about the difficult but rewarding task of encouraging people to share knowledge and enabling them to use their creativity in innovative ways in organisations.

Management's role is to create an environment within an organisation whereby knowledge can and will be shared, after having answered the question "Knowledge to do what?" as mentioned in the introduction.

Just in time knowledge management
Snowdon (2002) indicates that there are three common mistakes in KM system design:
* assuming that human beings are always rational,
* assuming that experts automatically share all of their knowledge on request,
* and assuming that workplaces can be managed systematically, like a machine.

He also indicates that KM on the basis of codification of knowledge to databases that operate on a pull basis has only been marginally successful. He attributes this particularly to the fact that staff often had to participate in tasks in "addition to their regular jobs". Other reasons for failures he does not mention may include that many initiatives have not really been thought through carefully or that failures get more attention in literature.

To overcome these limitations he introduces the term *Just in Time Knowledge Management.* This concept places emphasis on stimulating natural knowledge flows rather than imposing a "rational" model onto human systems. The approach is to trigger gradual change in a chosen direction by using a sound but flexible KM system with many different tools for communication and collaboration, from which individuals can choose those that most naturally support their work.

A definition of knowledge management
There are many different definitions of KM as the examples in Box 3 show. In general these definitions focus on organisations, such as the following one by Beijerse (1999):

"Knowledge management can be defined as achieving organisational goals through the strategy-driven motivation and facilitation of (knowledge)workers to develop, enhance and use their capability to interpret data and information (by using available sources of

information, experience, skills, culture, character, etc.) through a process of giving
meaning to these data and information."

This definition would become more complete if it also included the achievement of
personal goals. Still, it is closely linked to our perspective on KM as mentioned in the
introduction: It states that KM is about **strategy, people and processes.** It also implies
that it is about **enabling (or hampering) factors** such as culture and technology. We will
discuss these factors in the following sections.

Box 3. Definitions of knowledge management (KM)

Knowledge management can be defined as achieving organisational goals through the strategy-driven
motivation and facilitation of (knowledge)workers to develop, enhance and use their capability to
interpret data and information (by using available sources of information, experience, skills, culture,
character, etc.) through a process of giving meaning to these data and information. (Beijerse, 1999)

Knowledge management is the collection of processes that govern the creation, dissemination and
leveraging of knowledge to fulfil organisation objectives. (Gurteen, 1998)
(http://www.gurteen.com/gurteen.nsf)

Knowledge management is the process through which organisations generate value from their
intellectual and knowledge-based assets. (Megan Santosus and Jon Surmacz)
(http://www.cio.com/research/knowledge/edit/kmabcs.html)

Knowledge management caters to the critical issues of organizational adaptation, survival, and
competence in face of increasingly discontinuous environmental change [..] Essentially, it
embodies organizational processes that seek synergistic combination of data and information
processing capacity of information technologies, and the creative and innovative capacity of
human beings." (http://www.mywiseowl.com/articles/Knowledge_management)

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3.   Strategy

KM is never a stand-alone activity; it always takes place in a context. Organisations develop a strategy to realise goals that are based on their long term vision. They use different means (people, finance, machines, information etc.) to reach their goals and provide their services. Here we will briefly discuss KM strategies in the organisational context - although you can also develop your own KM plan (for tips see the section: Improving KM).

3.1   What is a knowledge management strategy?

A KM strategy is simply a plan that describes how an organisation will manage its knowledge better for the benefit of that organisation and its stakeholders. Such a plan will give you a clear idea of where you are now, where you want to go and how you will get there. A good KM strategy is based on and closely linked to the mission, vision and goals of that organisation and it addresses the real needs and issues.

Roberts, in his article Developing a KM strategy (http://www.steptwo.com.au/papers/kmc_kmstrategy/index.html), defines two approaches to developing a KM strategy: 1) a top down approach whereby the overall strategic direction of the organisation is used to identify the focus of the KM activities; and 2) a bottom-up approach, whereby research is conducted into the activities of staff involved in key business processes. The findings of this research highlight key staff needs and issues which are then tackled through a range of KM initiatives. Roberts argues that, in practice, a KM programme must encompass both approaches.

One of the tools that can help in developing and implementing a KM strategy is the **Knowledge Value Chain** by Weggeman (2000). This tool links KM to the mission, vision and goals of an organisation. It will also help you to define, amongst other things, the knowledge that you need, the knowledge that you have, and the knowledge that you need to develop; and it relates these to the strategy, culture, management style, staff, structure and systems of an organisation. The knowledge value chain is explained in more detail in the section on TOP models and tools.

3.2   The strategy document

A relatively brief and informal KM strategy could be structured around three questions:
1.   Where are we now?
2.   Where do we want to be?
3.   How do we get there?

It is important to develop a brief strategy document to stimulate further discussion. There is no blueprint for such a document as every organisation has its own needs, but the Knowledge Value Chain helps to structure your ideas. An annotated outline is presented

below. Other tips for framing a strategy document can be found at
http://www.nelh.nhs.uk/knowledge_management/km2/strategy_toolkit.asp and at
http://www.km4dev.org/index.php/articles/faqs/c45/ (if the link doesn't work, go to
www.km4dev.org, click on KM4DEV FAQ, Developing a KM strategy).

A more detailed outline for a KM plan, taken from the KM workshop reader developed for
the Sixth Water Information Summit in Delft could be:
1. **Why?** (Project Rationale): usually formulated in terms of the KM needs to meet a
    particular organisation's goals or a particular community's common interests,
    including the difference between that entity's KM vision and the current state of its
    KM.
2. **What and How** (Project Design): a narrative and/or tabular description of expected
    KM outcomes for the organisation or community, project outputs to realise those
    outcomes, activities to produce those outputs, and inputs (people, goods, service,
    finances) needed to implement those activities.
3. **When and by Whom** (Implementation Strategy): a schedule of activities and outputs,
    including milestones, as well as who is responsible for implementing each activity
    and for coordinating overall implementation (to ensure timeliness and adequacy of
    outputs).
4. **Successful?** (Monitoring and Evaluation Strategy): a plan for measuring and
    evaluating the success of various activities of the KM project, including actively
    learning from experimental activities and pilot activities.
5. **What happens next?** (Sustainability Strategy): a proposal for how successful KM
    activities will be scaled up, sustained and/or institutionalised beyond the duration of
    the project.

Often, KM initiatives are already taking place in organisations before there is an "official"
KM strategy. In fact, the initiative to develop a strategy sometimes arises from the need to
organise the KM activities that are already taking place spontaneously.

Is it then always necessary to develop an "official" KM strategy? The answer to that
question depends on the needs of the organisation. But strategies – if endorsed by both
management and employees – usually increase the likelihood that the necessary
resources are secured and they give you a basis against which to measure your progress.
Again, look at the lessons from the KM pioneers (section "A crucial question").

When thinking about developing a strategy or starting a KM initiative, or any initiative for
that matter, this thought might help: Think big, start small and practical.

3.3   Monitoring and evaluating KM efforts

It is essential to monitor and evaluate your KM efforts. Monitoring is the continuous
process of collecting and analyzing data to compare how well a project, programme, or
policy is being implemented against expected results. Evaluation is the systematic
assessment of a completed or ongoing activity and can be done internally or with external

support (OECD/DAC, 2002). Successful KM efforts contribute to achieving organisational goals and personal KM goals of employees. So the quantitative and qualitative indicators you use to monitor and evaluate your KM efforts depend on the objectives and activities that you have formulated in your organisational strategy and your KM strategy. Below we give a few examples, but you will have to develop your own indicators preferably as a team effort as this will help to raise interest in KM.

KM can be monitored and evaluated by looking at, for instance:
- Increase of attention to KM and knowledge sharing, reflected in available documentation, for instance in job descriptions, incentives offered, personal commitment statements.
- Specific budget allocations in terms of time and money for KM activities, including organisational learning.
- Increase in KM activities such as CoPs, meetings, forums etc.
- Satisfaction of KM tools users

Evaluating the effect, the intended or unintended change due directly or indirectly to an intervention, and the impact, the primary and secondary long term effects (OECD/DAC, 2002), is more difficult. This could be done by exploring the effectiveness, the extent to which the intervention objectives were achieved and the change in efficiency, the measure of how economically the inputs/resources (funds, expertise, time, etc.) are converted to results, such as less time used to do a certain activity, increased quality of project proposals, less overlap between projects etc. This could be checked through, for instance:
- Stories that are being told in and outside the organisation;
- Peer review and internal review;
- After action reviews (for further explanation see): http://www.nelh.nhs.uk/knowledge_management/km2/aar_toolkit.asp or www.ks-cgiar.org/toolbox/).

4.   People

People are the crucial factor in all KM efforts. You may have a strategy, you may have technologies and processes in place, but if people – at both management and other levels – are not actively involved in KM activities, your KM efforts will fail. Learning is an important part of any KM initiative. Therefore, we will limit the discussion here to knowledge acquisition, learning and learning styles, and training. At the end of this section we will briefly address the question of who, in an organisational context, is usually involved in KM.

4.1   Knowledge acquisition

Knowing how we acquire knowledge helps us to understand how we can go about KM. This aspect is rarely addressed in KM literature, but in view of its importance is presented in some detail in this section.

Knowledge acquisition (learning) is a personal capability and capacity to act. We can express it in a formula as a combination of information (I), experience (E), skills (S) and attitudes (A) including the effect of culture and beliefs. So our experience, skills and attitude determine how we acquire knowledge (Weggeman, 2000).

$$K = (I \times E \times S \times A)$$

We apply a "knowledge filter" to whatever information we receive through our senses. This "filter" will determine, for instance, whether we are open to new ideas, whether we can grasp new information, whether we accept that although persons are from another culture, their ideas may be very valuable.

The filter also applies to the sender, because knowledge as such cannot be shared with someone else. It needs to be turned into information – oral, written, graphic, gestured or body language. The receiver in turn gets the information through his/her senses, filters it and interprets it in his/her own way.

We all remember receiving lectures from very knowledgeable professors, which unfortunately we were not able to grasp, whereas other teachers, perhaps less knowledgeable, were able to reach out to us, using among other things a series of emotions related to their work, in a transfer process that is difficult to explain (Sarriegi, 2002).

So it is clear that knowledge acquisition goes well beyond the issue of information. It depends on the previous knowledge a person has, the style of presentation, the learning style, attitude and perception of the receiver about the environment, the institute, the professor, the colleagues etc.

4.2   Learning styles

Learning exposes us to new ideas and new ways of thinking when we leave our "safe" environment and enter into new experiments. It allows us to embrace confusion and explore errors as a basis for learning, and helps us to admit that we do not know it all.

Every person has an individual learning style. We will briefly discuss two models of learning styles here: David Kolb's learning styles model and the four dimensions of learning styles by Felder and Silverman.

The four dimensions of learning styles – Felder and Silverman
We learn in different ways — by seeing and hearing; reflecting and acting; reasoning logically and intuitively; memorizing and visualizing and drawing analogies and building mathematical models; steadily and in fits and starts. Teaching methods also vary. Some instructors lecture, others demonstrate or discuss; some emphasize memory and others understanding (Felder and Silverman 2002) (http://www.ncsu.edu/felder-public/Papers/LS-1988.pdf).

Felder and Silverman indicate that "learning in a structured educational setting may be thought of as a two-step process involving the reception and processing of information. In the reception step, external information (observable through the senses) and internal information (arising introspectively) become available to students, who select the material they will process and ignore the rest.

The processing step may involve simple memorization or inductive or deductive reasoning, reflection or action, and introspection or interaction with others. The outcome is that the material is either "learned" in one way or another or "not learned".

Every person has an individual learning style, as was mentioned before. This corresponds with the way we process information in the two hemispheres in our brain. In training and education it is therefore important to use different ways of providing information and creating learning opportunities that use both sides of the brain.

One of the most cited publications in relation to learning and engineering education is Felder and Silverman (2002). They distinguish four different dimensions to create understanding of the different learning styles (Table 1) and have developed a self-scoring instrument to assess one's personal learning style (http://www.ncsu.edu/felder-public/ILSpage.html).

Table 1: The four dimensions of learning styles (Felder and Silverman 2002, [1988])

Sensory / Intuitive	What <u>type of information</u> do we preferentially perceive: sensory (external)—sights, sounds, physical sensations, or intuitive (internal)—possibilities, insights, hunches?
Visual / Verbal	Through which <u>sensory channel</u> is external information most effectively perceived: visual—pictures, diagrams, graphs, demonstrations, or auditory—words, sounds?
Active / Reflective	How do we prefer to <u>process information</u>: actively— through engagement in physical activity or discussion, or reflectively— through introspection?
Sequential / Global	How do we progress toward <u>understanding</u>: sequentially—in continual steps, or globally—in large jumps, holistically?

David Kolb's learning styles model
(This information is adapted from Alan Chapman 1995-2005:
http://www.businessballs.com/kolblearningstyles.htm).

Another way to look at learning styles has been offered by Kolb. His model includes four learning styles (or preferences), which are based on a four-stage learning cycle. The cycle of learning includes:
- Concrete Experience (CE)
- Reflective Observation (RO)
- Abstract Conceptualization (AC)
- Active Experimentation (AE).

In this model, concrete experiences lead to reflection and observation, which in turn lead to the forming of concepts that are then tested and lead to the creation of new experiences. So the learning process represents a learning cycle or spiral where the learner 'touches all the bases' i.e. a cycle of experiencing (CE), reflecting (RO), thinking (AC), and acting (AE).

The four learning styles (or preferences) based on this cycle are:
- **Diverging** (feeling and watching - CE/RO): 'Divergers' rather watch than do and perform better in situations that require ideas-generation (for example brainstorming).
- **Assimilating** (watching and thinking - AC/RO): 'Assimilators' like abstract ideas and concepts. They require good clear explanation rather than practical opportunity. They excel at understanding wide-ranging information and organising it in a clear logical format. In formal learning situations they will prefer lectures, exploring analytical models and having time to think things through.
- **Converging** (doing and thinking - AC/AE): 'Convergers' are best at finding practical solutions and practical uses for ideas and theories. They like to experiment with new ideas and to work with practical applications.
- **Accommodating** (doing and feeling - CE/AE): 'Accommodators' rely on intuition rather than logic. They prefer to take a practical experiential approach and often take action and initiative.

According to Kolb, people will usually learn more effectively if the way they learn matches their learning style preference. For instance, an "Assimilator" may want to have a theoretical framework and would probably not feel comfortable "jumping right into things", contrary to the "Accommodator".
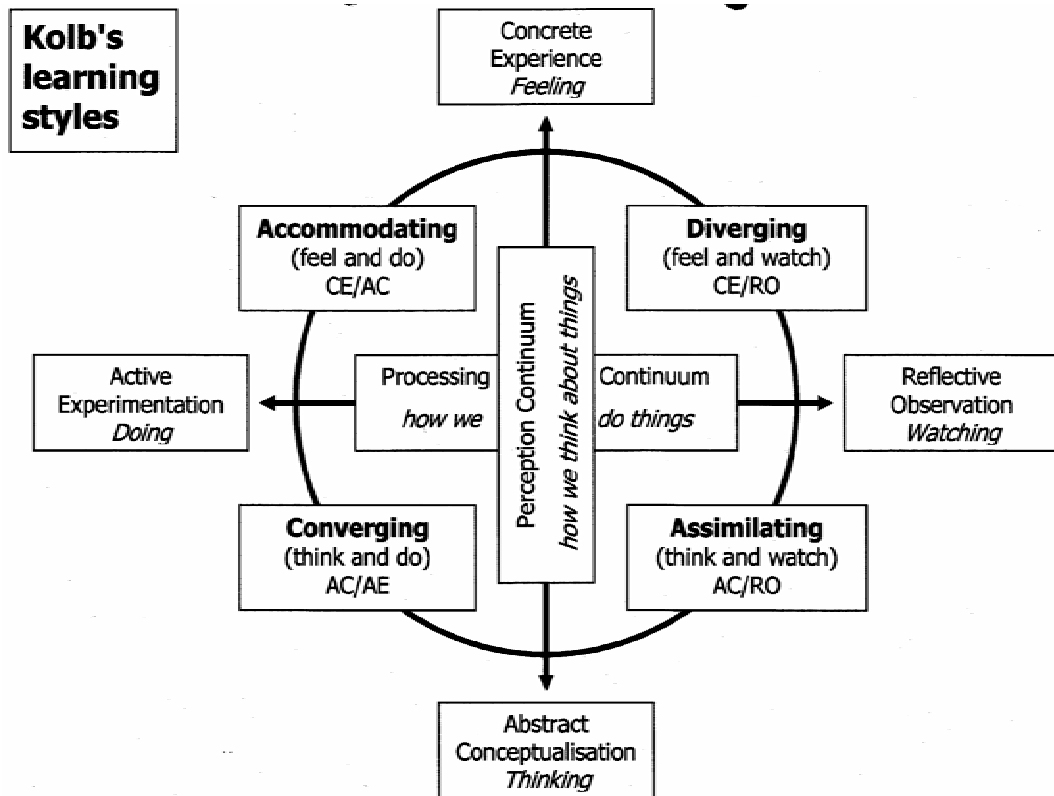
Figure 2. The learning cycle according to Kolb

See http://www.businessballs.com/kolblearningstyles.htm for an explanation in English of David Kolb's model and the terms mentioned above.

4.3   Training and learning

A wide range of techniques are available to trainers and teachers including lecturing, demonstrations, providing reading material, creating a dialogue, taking tests etc. The effect of these different techniques in terms of knowledge acquisition is not the same (Figure 3), showing that just listening is definitely not sufficient.

Ten Dam (1990) argues that the human memory can be seen as a processing system, with a long and a short term memory. The short term memory is the reception desk where the information enters. The long term memory is the real memory, the place where the information is stored and can be retrieved for later use. To make the information enter here, trainees have to work with it.

He found that students, in general, just remember 5 to 15% of the information given in lectures. What they remembered depended on the way they received the information, and what they did with it after the session. Results are better if information is repeated, or more importantly if it is applied in assignments.
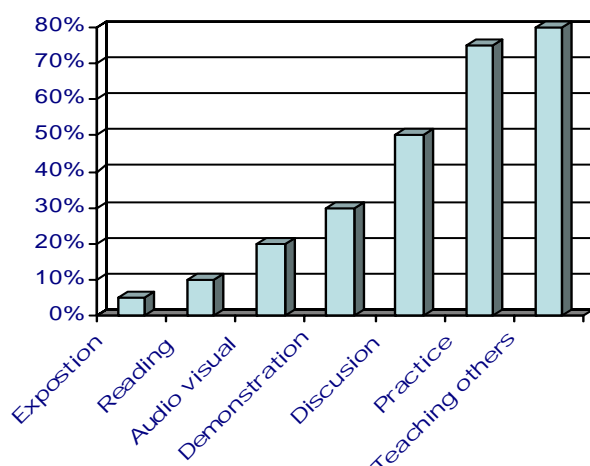
Figure 3. Relation information retention and training technique (Lang, H. in Ten Dam, 1990)

The short term memory has limited capacity, so the trainee has to work with the information received before new information is provided, otherwise it will be forgotten. For teaching this means we could use the last part of a lecture for exercises or for summarizing (repetition) instead of presenting more information.

Another important finding was that trainees do not listen with the same degree of attention throughout a lecture. They do well in the first 20 minutes, but then attention is decreasing and accuracy of note taking drops from almost 100% to 50% after 40 minutes and 30% after 50 minutes.

The effectiveness of the lecturer also plays a role. The finding was that lecturers are not able to lecture adequately for more than 20 to 30 minutes. So for both student and lecturer it is essential to build in alternative activities after some 20 to 25 minutes.

Furthermore it is good to remember that the study of written materials is more efficient than lecturing so it is very important to provide good quality written and visual material. Particularly in more oral cultures the visual material is crucial.

These results very much support Felder's (2000) recommendation to apply a variety of techniques to stimulate the learning process. It is important to look at all the components (I, E, S and A) to ensure the best conditions for learning and knowledge sharing. We will return to the question of what these conditions are in section 7 "Enablers and barriers".

4.4   KM roles in an organisational setting

Who should be involved in KM? Who is accountable for the results of KM activities? Who are the knowledge workers in an organisation and what roles do they play? These are questions to take into account when planning KM activities.

In an interview Davenport and Prusak predicted that: "The best firms of the future will be those in which everyone creates, shares and uses knowledge instead of hoarding it. Too many firms make knowledge the province of a single group - for example the R&D section". (http://www.brint.com/km/davenport/working.htm). It takes time to change this and to realise that knowledge is everybody's job.

Having said that, there are different staff groups that may have a special role in KM efforts (http://www.nelh.nhs.uk/knowledge_management/km2/processes.asp) and it might be good to identify these groups in (and perhaps outside) your organisation:

- **Senior management**: management buy-in and support is vital to the success of KM activities. For one thing, it helps to secure the allocation of resources.
- **Knowledge managers**: they are often the ones who drive KM efforts. A large organisation may need a team of knowledge managers; in a small organisation a single knowledge manager could be sufficient.
- **Knowledge workers**: these are the people who gather and share knowledge on a day-to-day basis, for instance, writers, newsletter and web page editors, librarians, researchers, but also, for instance, secretaries.

In this context it is also important to look at the different kind of expertise that knowledge workers may have (Box 4).

Box 4. Different types of knowledge workers
- Content experts, having knowledge and experience in specific areas of expertise
- Communication experts, having the experience to assist content workers to codify their knowledge in such a way that it becomes understandable by a specific target group
- Information experts, having the experience to organise information and knowledge resources using a normalised taxonomy and/or system
- Process experts, having the ability to organize the knowledge flow to ensure that users have access to good quality information and relevant content experts

5.   Processes

This section briefly discusses different types of processes and gives examples of some that specifically deal with knowledge or information.

5.1   KM/IM as primary or secondary processes

Within an organisation we can distinguish primary processes and secondary processes. Primary processes are those that are judged essential to an organisation's performance. Without these primary processes the organisation would not "be in business", it would not have good reasons to exist. These primary processes may be different for different organisations. For example, for a manufacturing company the production of let's say clothes might be a primary process. For a philanthropic foundation a primary process might be grant application. Secondary processes are processes that support the primary process(es). This could be for example accounting or personnel management.

KM processes can be defined as the activities or initiatives you put in place to enable and facilitate the creation, sharing and use of knowledge for the benefit of your organisation (http://www.nelh.nhs.uk/knowledge_management/km2/processes.asp). KM processes have to be seen in the broader context of an organisation's vision, mission, general infrastructure and processes or "ways of doing things" where knowledge also plays an important role. For knowledge organisations KM processes can be seen as primary processes; whereas for manufacturing companies, for example, they would be secondary processes.

5.2   Examples of KM and IM processes

Whether KM processes are primary or secondary processes in your organisation, there are many initiatives or activities that an organisation can undertake. Below is a list of common processes related to KM and IM. The list includes examples and is structured as much as possible according to the processes in the Knowledge Value Chain and matrix by Weggeman, as explained in the section "TOP models and tools." This list, which is mostly self explanatory, is by no means exhaustive, but it will give you a general idea

- **Identifying knowledge needed**: benchmarking, roadmapping, analysing in brainstorms, holding interviews with staff and clients.
- **Developing knowledge**: identification and evaluation of new ideas, organising brainstorming sessions or training sessions.
- **Collecting and storing information:** searching for relevant information, introducing database or archive systems for storing the information, training people in the use of databases, documenting experiences, having exit interviews, setting up a library, setting up a website, capturing the knowledge of experts and making it available to others (http://www.nelh.nhs.uk/knowledge_management/km2/harvesting_toolkit.asp).
- **Sharing knowledge and information:**

- Publishing and packaging information: setting up an intranet or a website, publishing books and articles, CD-ROM, DVD, video etc. Example, reworking your 100-page document meant for an academic audience into a four-page briefing for policy makers; into a radio message for a local community in Africa; and into an article for a newspaper.
- Sharing knowledge: introducing job rotation, or apprenticeships, setting up communities of practice (CoPs), having informal gatherings around the water cooler, organising (e-)conferences, sending e-mails, coaching and mentoring, specialist days, telling stories (for more information on story telling: http://www.nelh.nhs.uk/knowledge_management/km2/storytelling_toolkit.asp and http://www.kwork.org/resources/narrative.pdf)

- **Applying and maintaining**: practising with new tools (which, in turn, can also create new knowledge), developing best practices; attending refresher courses, keeping abreast of new developments in specific fields by reading relevant journals.
- **Evaluating** the content and/or the process: evaluating the relevance of the content of your databases and adapting it, organising after action reviews, surveys.

6.   Technology

In the introduction we mentioned growing technical possibilities as one of the factors that have stimulated interest in KM. The use of technology can facilitate knowledge sharing and KM, but it may also hamper the process. Therefore, Odhiambo and Pels argue that KM requires a clear strategy which is technology-enabled and not technology driven (Pels and Odhiambo, 2005) http://www.irc.nl/page/3963.

6.1   The KM spectrum

We have previously mentioned that one of the reasons for the confusion surrounding KM is that people write and talk about it from different perspectives, having learnt from different applications. Binney (2001) (http://www.km4dev.org/index.php/articles/downloads/315) presents an illustrative overview of the wide spectrum of technical possibilities and the related tools. The spectrum is based on an extensive literature review and comprises six types of KM applications. For each application a number of specific supportive technologies are presented. Web technologies are underpinning a range of applications such as Internet, intranet, extranet and portals.

The KM spectrum (Table 2) defines six types of KM:

- **Transactional KM**: the use of knowledge is embedded in the application of the technology. Knowledge is presented to the user of a system in the course of completing a transaction or a unit of work, e.g. entering an order or handling a customer query or problem.
- **Analytical KM:** provides interpretations of, or creates new knowledge from, vast amounts or disparate sources of material. Turns data into information, which, if acted on, can become knowledge, e.g. MIS.
- **Asset management KM**: refers to 1) the management of explicit knowledge assets which have been codified in some way; b) the management of intellectual property (IP) and the processes surrounding the identification, exploitation and protection of IP.
- **Process-based KM**: covers the codification and improvement of processes, also referred to as work-practices, procedures or methodology.
- **Developmental KM**: focuses on increasing the competencies or capabilities of an organisation's knowledge workers; investing in human capital through training, experiential assignments or membership in a community of interest.
- **Innovation/creation KM**: focuses on providing an environment in which knowledge workers, often from differing disciplines, can come together in teams to collaborate in the creation of new knowledge.

For each of these types the KM spectrum identifies KM applications and enabling technologies. This overview helps to clarify the different perspectives people have as a

basis for their points of view ("what they are talking about"), even if they do not understand all the terms. It shows the breadth of KM applications and enabling technologies.

Table 2: The KM Spectrum, its tools and technologies (Binney, 2001) (http://www.irc.nl/page/3986)

	Transactional	Analytical	Asset Management	Process	Developmental	Innovation and 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) • *Competitive Intelligence*	• Intellectual Property • Document Management • Knowledge Valuation • Knowledge Repositories • *Content Management*	• TQM • Benchmarking • Best practices • Quality Management • Business Process (Re)Engineering • Process Improvement • Process Automation • Lessons Learned • Methodology • *SEI/CMM, ISO9XXX, Six Sigma*	• Skills Development • Staff Competencies • Learning • Teaching • Training	• Communities • Collaboration • Discussion Forums • Networking • Virtual teams • Research and Development • *Multi-disciplined Teams*
Enabling Technologies	• Expert Systems • Cognitive Technologies • Semantic Networks • Rule-based Expert Systems • Probability Networks • Rule Induction, Decision Trees • *Geospatial Information Systems*	• Intelligent Agents • Web Crawlers • Relational and Object DBMS • Neural Computing • Push Technologies • Data Analysis and Reporting Tools	• Document Management Tools • Search Engines • Knowledge Maps • Library Systems	• Workflow Management • Process Modeling Tools	• Computer-based Training • Online Training	• Groupware • e-Mail • Chat Rooms • Video Conferencing • Search Engines • Voice Mail • Bulletin Boards • Push Technologies • Simulation Technologies
	• Portals, Internet, Intranets, Extranets					

Technologies can enhance knowledge sharing and KM but, they may also hamper the process, for instance, when employees refuse to adopt certain technologies, when they feel they receive insufficient training, or when technologies completely replace face-to-face contact.

Hence, whereas technology is important as an enabling factor for KM, it is essential to realise that technology is only one of the components. Gradually the understanding has grown that the human factor is the centre piece of every successful KM application. Only when a culture of knowledge sharing exists, is it possible to truly benefit from the growing technological possibilities. (Pels and Odhiambo, 2005) http://www.irc.nl/page/3963.

We will briefly discuss other enabling factors besides technologies, such as culture, in the next section.

7.   Enablers and barriers

In the previous section, technologies were identified as one of the important enabling (or hampering) factors. Here we will briefly discuss other factors that influence knowledge sharing and KM, such as culture, personal factors, and policies.

7.1   Culture

Culture encompasses commonly held values, beliefs, and attitudes. But what kind of organisational culture is favourable for KM? A possible answer would be a culture that encourages and nurtures learning and knowledge sharing.

Learning organisations

An important aspect of KM is learning. But forcing people to learn is practically impossible. It is possible, however, to create an environment that encourages learning and fosters creativity. Peter Senge (1990), recognised worldwide for his book "The Fifth Discipline", talks about learning organisations: "…. organizations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together".

The basic rationale for such organisations is that in situations of rapid change only those that are flexible, adaptive and productive will excel. For this to happen, it is argued, organisations need to "discover how to tap people's commitment and capacity to learn at *all* levels".

For a "learning organisation it is not enough to survive. Survival learning (adaptive learning) is important – indeed it is necessary. But for a learning organisation, adaptive learning must be joined by generative learning, learning that enhances our capacity to create" (Senge, 1990).

Senge distinguishes five elements that are important in a learning organisation:

1.   System thinking
2.   Personal mastery
3.   Mental models
4.   A shared vision
5.   Team learning

For more information on Senge's theory: http://www.infed.org/thinkers/senge.htm

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System thinking is the conceptual cornerstone ("The Fifth Discipline") of his approach. It provides the ability to comprehend and address the whole, and to examine the interrelationship between the parts. This overcomes one of the key problems in

management, the tendency to adopt a simplistic framework to what are complex systems and to focus on the parts rather than seeing the whole.

John Farago and David J. Skyrme (1995) mention the following characteristics of a "learning culture" (http://www.skyrme.com/insights/3lrnorg.htm#culture):

- **Future, external orientation**: these organisations develop understanding of their environment; senior teams take time out to think about the future. Widespread use of external sources and advisors e.g. customers on planning teams.
- **Free exchange and flow of information**: systems are in place to ensure that expertise is available where it is needed; individuals network extensively, crossing organisational boundaries to develop their knowledge and expertise.
- **Commitment to learning, personal development**: support from top management; people at all levels encouraged to learn regularly; learning is rewarded. Time to think and learn (understanding, exploring, reflecting, developing)
- **Valuing people**: ideas, creativity and "imaginative capabilities" are stimulated, made use of and developed. Diversity is recognised as a strength. Views can be challenged.
- **Climate of openness and trust**: individuals are encouraged to develop ideas, to speak out, to challenge actions.
- **Learning from experience**: learning from mistakes is often more powerful than learning from success. Failure is tolerated, provided lessons are learnt.

Why don't people share?
Knowledge sharing is an important part of KM. But a comment often made is that people don't share their knowledge or information. David Skyrme explains possible personal reasons (http://www.skyrme.com/updates/u64_f1.htm), which we will only summarise here:
- The belief that knowledge is power
- The "not-invented-here" syndrome
- Not realising how useful particular knowledge is to others
- Lack of trust
- Lack of time

Other reasons may include:
- Inadequate technology
- Internal competition
- Top-down decision making
- Organisational structure
- Not reflected habits

Also, the culture of one country may be more favourable to knowledge sharing than the culture of another. For instance, in a culture where strong hierarchical relations exist between different groups (managers-staff, men-women, better-off – poor people), knowledge sharing between these groups may need special efforts to make it work.

7.2 Policies and organisational structure

Having KM policies and procedures can facilitate knowledge sharing and management. But people may have reasons not to adhere to KM policies. For example, they may not be aware of the policies or the policies may not be clear; they be too busy to find the time; there may be cultural barriers; they may not want to share their knowledge; they may not see the advantage; they may not understand the technologies; they don't feel that KM is part of their role; or the organisation does not actively support KM.

If the organisation does want to actively support KM, it could think of incentives for people to adhere to the policies, such as making clear what's in it for them, sharing success stories, and making access to information as easy as possible.

The structure of an organisation also may have an impact. In an organisation with different departments it may be more difficult to establish links between staff in these departments. In a project based organisation teams are changing according to project objectives. This stimulates knowledge sharing between team members but may need additional efforts to share it with other staff. Flexibility in the structure is an asset as it allows an organisation to adapt to the rapidly changing environment. In an organisation with many hierarchical layers it may prove more difficult to pass information and knowledge from one layer to the next. (http://www.nelh.nhs.uk/knowledge_management/km2/processes.asp)

7.3 Other enablers and barriers

There may of course be many other enablers and barriers than the ones mentioned above. David J. Skyrme mentions a list of critical KM challenges (http://dev.skyrme.com/updates/latest.htm#Tip2) which he groups as follows:

- Enablers: these are what he calls the 'show stoppers' if they are not put in place, such as governance and ethics, a knowledge enriching culture, strategic integration, and a 'KM lens'.
- Levers: these work together in synergy to maximise outcomes, such as systematic processes for managing content, workspaces that work, and support for Communities.
- Foundations: these determine the ultimate KM capability of an organisation by, amongst other things, giving due attention to a wide range of human factors (human-centric KM) and a comprehensive ICT infrastructure.

7.3 Learning projects and learning alliances

Learning projects

Learning is very much stimulated by applying concepts in practice. A promising capacity building concept for the sector, called Joint Learning Projects, was developed in Colombia. In these projects participants from communities, agencies and universities share experience and learn by probing a problem and implementing possible solutions in a relatively protected setting (Visscher et al., 2005).

The setting for these projects reflects "real life conditions", but is 'protected'. People are allowed to make mistakes, as all involved accept that they are learners. They take problems as opportunities to grow, allowing sufficient time for discussions between the political, institutional, professional, and community interest groups.

Learning alliances

Learning alliances are a new concept being promoted by IRC and its partners to overcome the limitations on international research findings and local innovations (such as the rope pump) going to scale, and to overcome sector fragmentation. (In 2005 IRC organised the 'Learning Alliance Symposium'. The report is available here: http://www.irc.nl/la)

A learning alliance is defined as "a group of individuals or organisations with a shared interest in innovation and scaling up of innovation, in a topic of mutual interest. An alliance typically consists of a series of structured platforms, at different institutional levels, designed to break down barriers to horizontal and vertical information sharing, and thus to speed up the process of identification, adaptation, and uptake of innovation" (Moriarty et all, 2005).

The defining feature is that they bring together a wide range of partners with capabilities in: implementation; regulation; policy and legislation; research and learning; and documentation and dissemination. In this they reflect the learning projects previously mentioned. They are different from a community of practice which is typically made up of peers, a group of people with a similar background (ibid).

Important aspects of learning alliances are a shared understanding of the problem to be solved and a set of common objectives for which the members feel / take ownership (ibid).

8.   Improving knowledge management

8.1   Improving your personal knowledge management

In this section KM tasks are discussed at the personal level, including the personal network, and suggestions are made for potential improvements. Personal KM strategies should also be linked to the organisation that the knowledge worker is working for, and to the strategies that the organisation is developing, as indicated in section 8.2. A website that is useful to review in relation to improving KM is www.ks-cgiar.org/toolbox.

Individual level

We learn about the world in two different ways. We learn through our direct daily interactions, often not realizing what we are learning (a child constructs its first mental models of the world even before it can speak). And we know it through the descriptions of others (indirect knowledge lived by another person), often being able to indicate when we learned a specific issue (Pentti, 2003).

At the personal level we can all be considered knowledge managers. We integrate information from a large number of sources, including our own practical experience. By selecting specific training courses, buying specific information products and talking to selected persons we are actively managing the acquisition of new knowledge.

Every individual uses IM tools – including notebooks, file cabinets, professional networks, friends, email archives, calendars, post-it notes, bulletin boards, newsletters, journals, and restaurant napkins. Tools are enablers; the means to the ends. They are there to support you and should not dictate how you work.

Personal KM skills are far more important than technical tools (Richardson 2001). These skills include:

- Ways that people filter information to reduce overload (info glut)
- Effective reading
- Concise note-taking
- Making sense of and analyzing information
- Synthesizing information
- Communicating effectively with others

Personal networking

Many people get their information from face to face meetings and by approaching people in their network. With search engines on Internet becoming more powerful it is now feasible to access a lot of information, but if you want to know something quickly and want to be sure about its relevance you talk to a "friend" or an "expert".

In this sense personal networks, consisting of informal individual relations between friends and colleagues, are very important. These networks can comprise many individuals and do not have a common purpose or strategy. But what they often do have is a level of mutual trust, giving confidence that you can better rely on the quality of the information.
You may also be part of a community of practice (CoP). In these groups, people who share an interest in a specific topic voluntarily interact to share, create and update knowledge and information. They interact to develop new knowledge and experience in a specific area. The lifespan of a CoP is determined by the value it creates for its members. (Collison and Parcell, 2004). More on CoPs is in this downloadable article:
http://www.knowledgeboard.com/cgi-bin/item.cgi?id=98480&d=pnd

Getting better at it
Enhancing KM on a personal level is mainly about improving IM and knowledge sharing skills and strengthening your networking. So it is about issues such as improving your abilities in searching for information on the *Internet* and in libraries, getting better at writing, reading and presentation and networking.

In this section some ideas are presented to assist you in getting started on improving your personal KM or the KM in your organisation.

Develop your personal KM map
The aim of developing a personal KM map is to get people to think and talk about their information behaviour in a systematic way in relation to the organisation they work for. This map looks at skills, experience and attitude. It is constructed by answering a set of questions, which can be modified to suit a specific organisation (Odhiambo and Pels, 2004). The questions are:

1. Who are you working with?
2. How do you obtain the information you need?
3. How do you share information/knowledge?
4. How do you document what knowledge you have?
5. What do you need to learn?

Possible improvements
You may use the results to identify where you can do better and which improvements might be most effective. A few tips that may help on the IM side, based on David J. Skyrme, 'The Knowledge Networker's Toolkit' (Butterworth-Heinemann, 1999) cited in Richardson (2001):
- *Develop a sourcing strategy.* Consider what periodicals or databases you need to scan regularly and which are accessible when you need them. Identify the best content sources, including people, for each of your information needs.
- *Work out how and when to process information.* With incoming information, you can read it immediately, file it or trash it. Using software filters to automatically process incoming electronic information turns push into pull. If you don't need to work on a

given folder right now get it filed. The three D principle also gives good guidance: Do it, Delegate it (to some one else or to yourself at a later moment) or Dump it.

- *Set criteria for what you want to file and save.* Why do you want to keep it? You may want to retain leading articles or information on work in progress but, for a lot of other information, you may be able to rely on the *Internet* and other sources that allow you to access what you need when you need it.
- *Create a personal filing system* with a well-designed structure that is appropriate to your work activities and areas of knowledge. File things away as soon as you can; don't leave them in a "to read" pile. For computerized information, use search tools that index all the information on your PC regardless of formats like Google (http://www.google.com/about.html) or Copernic (http://www.copernic.com/).
- *Refine your information.* You might, for example, codify information into different categories, such as facts, opinions and examples. As you collate it and use it, synthesize key concepts and messages.
- *Review your information periodically.* Prune ruthlessly based on use. If you don't access it within a time limit why keep it? If there is dust on your hard copy information, it probably can be dumped.

To this listing it is good to add some other ideas:
- Which contacts in your personal network are most important and do you need to expand your network into other areas of expertise?
- Which Community of Practice is most useful to you?
- What information you "filter" should you share (immediately) with others?
- Is it time to start your own data base of narratives? Coming off a project you can easily record in an hour, or even ten minutes, what it might otherwise take days to get around to spending half a day writing up (if it is ever done). Both the written record, which is reflective, and the spoken record, which is immediate, can provide different sources of value (Snowdon 2003).

In relation to the acquisition of knowledge a few other questions are important:
- Are you effective at what you do?
- What skills do you need to improve your work and what training can you follow to obtain these skills?
- Can you learn some of these skills from someone else by working with them and becoming an apprentice?
- Do you have special skills that you do not use in your work but might provide an important contribution to the work of your organisation?

8.2   Improving knowledge management at the organisational level

Organisations are repositories of knowledge that is only to a limited extent accessible in a tangible form. Most of the knowledge is embedded in the (heads of) staff of the organisation. This makes it difficult to manage because people travel, leave the organisation or do not package and store the information in such a way that others are able to find and digest it.

As Snowdon mentioned in his presentation on the Sixth Water Information Summit, the alternative, given much emphasis following the publication of Nonaka's paper, is the conversion of this tacit knowledge into explicit knowledge. This approach puts the focus on maximising efficiency whereas Snowdon feels the emphasis needs to be on increasing effectiveness.

It is important to realise that knowledge sharing is going on all the time in organisations because some people choose (volunteer) to share their knowledge, helping colleagues, individually or in informal communities of practice, by sharing what they know. Others, it has to be said, tend to keep their knowledge to themselves, as they feel it gives them power.

Knowledge sharing is important for an organisation. Several studies show that 20 – 30 percent of an organisation's resources are wasted reinventing the wheel (Boshyk, 2000, cited in Odhiambo and Pels 2004). So it is important to encourage staff to learn from others to reduce re-invention.

People develop better ways of doing their work all the time, and we also like to brag about it. In survey after survey, workers report that most of what they learn about their job, they learn from informal conversations. They also report that they frequently have ideas for improving work but don't tell their bosses because they don't believe their bosses care (Wheatly, 2001) or they are not rewarded for it.

Provide the conditions

An organisation wanting to improve its KM must provide the right conditions to support people's willingness to share and encourage interpersonal communications. Some of the requirements according to Wheatly (2001) are that staff must:

- Understand and value the objective or strategy;
- Understand how their work adds value to the common objective;
- Feel respected and trusted;
- Know and care about their colleagues;
- Value and trust their leaders.

Organisations can support individual KM by consciously looking at what staff actually do to manage their personal knowledge. Senior staff can then explore means of leveraging that to encourage more efficient knowledge sharing behaviours across the organisation and within projects.

This can be stimulated by encouraging and rewarding staff to share ideas and to participate in communities of practice or special interest groups. .

Other enablers include providing time and practical tools that are easy to use. For example, if private collaborative space (physical space in a building or digital space on Internet) is easy to use, informal Communities of Practice will develop on emerging issues.

Choosing KM software and electronic networking tools must be done very carefully so as to "fit" with how people actually work and manage their time. A field worker will benefit little from an on-line database that requires significant time in front of an office computer. They might benefit more by using and contributing to simple paper-based "fact sheets" or a hand-held computing device.

Asking for stories
Often it is easier to ask a staff member to tell a story on a specific issue rather than asking him/her to write it down, as the latter takes more time. Stories (positive and negative) told in an organisation, in presentations, in the corridor, over lunch, reveal the culture and provide new insights. Story telling thus may be a good way to capture tacit knowledge in an organisation.

Technological developments make it feasible to set up narrative databases. As outlined by Snowden (2002) these databases attempt to recreate as closely as possible the ways people share knowledge in face-to-face encounters at work or socially. There are two basic steps to create a narrative database. First is "capturing" the stories and second is "creating an index" that makes them useful.

Getting ahead
"Keep it short and simple" (KISS) is the most important advice given by different authors. It is rather easy to make KM very complex and to try to tackle a lot of activities at the same time by purchasing a strong information technology (IT) infrastructure. Many have fallen into this trap, trying to model the organisation after the IT infrastructure.

The main idea behind KM is to be supportive to the staff of the organisation in better reaching the organisational objectives.

This implies that KM has to build on their daily routines and needs to show a "rate of return" for the staff, to make them enthusiastic. Furthermore they need opportunities to see KM at work, whether it be through workshops, personal visits, case studies, guest speakers, journals or websites.

To make KM work, communication is essential, thus requiring (modest) communication means such as (lunch) meetings, newsletters, workshops, focused on-line discussions, training videos, bulletin boards and coffee breaks. Good communication, supported by management, will stimulate improved knowledge sharing.

Building on the personal knowledge maps
If staff have developed their own personal knowledge map then this may be a very good entry point. Bringing these maps together will give you a very good insight into the current situation, and can be used as an input for a brainstorming session with the staff on organisation-wide training or KM interventions. The results need to be in line with the goals and strategies.

Establish a KM scan for your organisation

An Internet-based KM scan can be found at http://www.provenbenchmark.nl/custom-scans/kmscans/. The scan will give you insight into the strong and weak areas of the Knowledge Value Chain in your organisation, thus giving indication of where you can start best. It needs to be completed by a good number of staff of the organisation to get a good picture. The added advantage is that the site also gives you the possibility to compare yourself with reference values derived from scans from other organisations/sectors.

IRC staff performed a KM scan in 2003 (Table 3). The top row and the first column of the table represent the categories from the Knowledge Value Chain and the Organisational Design Variables (Weggeman 2000). The results from the scan on a scale 1 to 5 are shown in the second row and column. The results in the matrix are on a scale referenced to the best score (Available / Personnel), which has been set to 100. The shaded values are below average (82.2) and these are the areas where most improvements can be made; the so called "low hanging fruits".

Table 3: KM scan result at IRC, 2003

Mission /Vision		Knowledge			Share	Apply	Evaluate
Goal(s)	**Available**	**Needed**	**Available**	**Develop**	Knowledge		
	Results KM scan	3,04	3,47	3,27	3,38	3,03	2,60
Strategy	3,17	74,5	85,0	80,1	82,8	74,2	63,7
Culture	3,45	81,0	92,5	87,2	90,1	80,8	69,3
Management style	3,58	84,1	96,0	90,4	93,5	83,8	71,9
Staff	3,73	87,6	100,0	94,2	97,4	87,3	74,9
Structure	3,23	75,9	86,6	81,6	84,3	75,6	64,9
Systems	3,22	75,6	86,3	81,4	84,1	75,4	64,7

The table shows that the staff perception is that evaluation (column 'Evaluate') is the weakest link in the chain. Further, it is felt that activities are needed that are related to structures, systems and strategy (75.9, 75.6 and 74.5) and activities to find out about knowledge needed and how to apply knowledge (75.6, 75.4 and 74.2 respectively).

The results can be used to plan KM interventions. In the above case the organisation has to come up with a way to reflect better. For this IRC installed three travel free weeks for staff to be in-house and discuss progress and plans. IRC plans to repeat the KM scan in 2005 and compare results to find out whether the interventions were successful and identify which issues should be tackled next. The KM scan can be a useful instrument for continuous improvement.

Establish a small team

It is good to establish a small team to develop a KM strategy, but they will have to share their ideas with the organisation as a whole to get enough ownership and co-operation.

They can start for example by looking at the Knowledge Value Chain and brainstorm about actions to take. They may consider taking just one of the goals and strategies of the organisation and exploring how KM related to that specific goal can be improved.

A key question to pose is: **are we doing the right things and are we doing them right?**

Some suggestions
It is important to start with activities that staff really feel to be useful and that help them in their work. Just a few examples:
- From the personal KM maps or from the CVs of your staff, yellow pages for resource persons for specific themes can be established. A more interesting way is to actually ask staff on which theme they would like to answer questions from colleagues.
- If the information data base of the organisation is not established properly, setting up a small library may be an idea. It may, however, be far more effective to help staff to improve their search capacity on the *Internet*.
- Staff can be encouraged to transfer some of their tacit knowledge into explicit information that can be accessed by colleagues. This may be done by providing simple formats, for example travel reports, by providing training to develop their writing skills and by setting-up a small reward system, for example for the best report.
- Usually staff do not search for new information unless they are encouraged to do so. Yet, for innovation it is essential that they open the windows of the organisation. An interesting option here is exposure visits to other organisations. Job rotation may also be an option.
- Internal communication may be a weak link. This can be improved by stimulating the development of thematic or product groups using face to face meetings to enhance the thinking. Once they function at a human level they can become a Community of Practice using the intranet or *Internet*.
- Inviting staff to give specific presentations on themes that are essential for the organisation, adopting the concept of peer assistance[3] where the presenter, instead of the audience, poses, say, three questions at the end of the presentation, that can help him/her to progress his/her ideas (peer assist).
- Newcomers to the job can be asked to make a round, posing questions and reporting on them to the team. This may be quite refreshing and may help to identify inefficient procedures that may have developed over time and otherwise are left unquestioned.
- Often improvement of KM requires a change in the culture of an organisation. This can be stimulated by rewarding positive behaviour and setting clear objectives - starting with IM and encouraging structured communication. Yet it must be realized that it also requires procedures that may have to be forced upon some of the staff by holding them accountable for results and their behaviour.
- Make it easy to set up a private collaborative space (physical or electronic), and encourage staff to use it, hence organizing their own information at little cost. This space can be built on by the organisation.

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[3] This approach is based on the adagio "tell me and I will forget, teach me and I will remember, involve me and I will learn"

- If private collaborative space is easy to use, informal CoPs will develop on emerging issues. This in itself will be encouraging, but some of these informal communities may go a step further and become a starting point for a formal CoP, as working patterns and trust are already established. Social Network Analysis techniques identify naturally occurring communities that can be formalised according to natural affinities. A possible pitfall may be staff devotion to the technology rather than the content, treating the collaboration as a hobby.
- Encourage apprentice systems as they are most efficient in "transferring" tacit knowledge through observation, coaching and practice and are often cheaper than systems based on codification.
- A simple approach is to organise midweek communication meetings where all staff reflect on their current work. Organising Friday afternoon "happy hours" may also work.
- E-mail is becoming an addiction in many organisations, with a growing negative impact on the productivity of the knowledge worker. Overcoming this obstacle may require careful review and strong measures. Some even suggest closing e-mail down for some time, others suggest installing a regime in which staff cannot be held responsible for e-mail sent to them as (blind) carbon copy (c.c./ b.c.c.).
- True cooperation for knowledge tasks requires more than simply appealing to a sense of duty and loyalty of staff to the organisation. They require time and it has to become officially part of their job to make things happen. Many job descriptions or qualifications lack "(active) knowledge sharing" as one of the requirements.
- Perhaps the best start is to organise a brainstorming day with all staff on knowledge sharing. This approach was followed for example with different organisations in the WELL project where a workshop approach was followed as shown in Box 5.

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Box 5. Workshop to develop a KM plan

Round of introduction; ice breaker, fears and expectations (plenary)
Introduction of concepts: IM, KM - a play on words
- What is knowledge? Why can it not be managed directly?
- KM perspectives; (Personal, Organisational, network level)
- KM landscape:
- KM applications:
- Enabling technology (same scale as applications)
- Knowledge Value Chain
- KM 'instruments': access, create, share and evaluate

Activities
- Personal information behaviour/personal KM; buzz groups and plenary
- organisational profile; individual, buzz groups and plenary
- Introduction to and applying KM scan,
- Where do we stand?; buzz groups and plenary
- How to network outside the organisation?; buzz groups and plenary

After recapping the knowledge value chain providing examples another set of activities was established
- Discussion of goals based on vision and mission; buzz groups
- Developing KM plan(s); group work
- Presenting KM plans; plenary; feed back by management
- Evaluation of workshop
- Closure

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8.3 Knowledge networks in the WSS Sector

Different forms of networking are taking place in the sector, some with the explicit aim of knowledge sharing between the North and the South and between countries in the South. The premise is that with such linkages, activities can be coordinated, knowledge can be shared, best practices can be exchanged, and common standards and procedures developed (Egger 2003). We focus here on institutionalised networks, therefore not discussing Communities of Practice or thematic groups.

The main objective of these knowledge networks is to create added value from co-operation, communication and networking efforts, as unified KM is usually impossible. There is a multiplicity of actors involved, each with their own sphere of interest, culture and systems.

Most knowledge networks have started as an informal network, a community of practice, but gradually become a more institutionalised network between organisations. The network partners are autonomous and contribute their resources voluntarily. They often share a common vision, objectives and rules. Where it concerns a more institutionalised network,

the partners usually sign an agreement (e.g. a memorandum of understanding MOU) and regularly organise events. Some even take the form of a legal entity.

Some examples
Examples of institutionalised networks are:
- Gender and Water Alliance (http://www.genderandwater.org) a network to mainstream gender in the sector;
- CAPNET (http://www.cap-net.org) a capacity building network for water resources management;
- Streams of Knowledge coalition (http://www.streams.net), a network of resource centres for the sector; and
- Rural Water Supply Network (RWSN) (http://www.rwsn.ch).

Several of these networks were initially driven by Northern organisations but have gradually handed over responsibility to Southern partners.

The organisations involved in these initiatives play an important role as intermediaries, bringing users and suppliers of information together, helping people to get access to information, ensuring easier access by adapting information to the local context and by bringing local information on to the internet.

According to Egger (2003) knowledge networks have a number of advantages. They:
- Help raise efficiency in their thematic area by building on complementary interactions. Partners in a knowledge network can divide their work and focus their activities on their specific strengths, pool resources and develop synergies;
- Make their partners' work more effective and contribute to better results as they facilitate communication and therefore the sharing of knowledge, helping partners to learn from each other to do their work more effectively;
- Support innovation and provide new answers in different fields by bringing together various actors from different disciplines.

Egger also indicates that, although some networks attain considerable impact in their sectors, others are more bureaucratic institutions, pushed by considerable donor funding. Some are quite dynamic, others static. All networks require a big effort from all parties involved and are often suspected of being excessively expensive.

Parallels in the private sector
Strategic alliances and inter-company networks have been gaining popularity in the private sector for their lower overhead costs, increased responsiveness and flexibility and greater efficiency of operations. Networks that are strategically guided are often fast growing and at the leading edge (Lorenzi and Baden-Fuller, 1995).

According to Lorenz and Baden-Fuller, a key characteristic of the more successful networks is that they are strategically guided by a "centre". This centre has four roles:

- Strategic outsourcing with partners, whereby partners are expected to be more than doers. They have to be problem solvers and initiators as well.
- Developing the core skills and competencies of partners, forcing them to share expertise with other members.
- Borrow ideas and technological developments from others to master new technologies.
- Based on the notion that a firm is only as strong as its weakest link, encouraging rivalry between the firms inside the network, in a positive manner.

Some examples:
- Benetton with 6000 shops and 400 subcontractors in production, with the centre involved in designing, selected production, systems and development of new technology.
- McDonalds with 9000 outlets and joint ventures in many countries. The centre is involved in marketing, systems and technology development.

Whereas these networks have a commercial product with sales potential and in that sense are different from the networks in the WSS sector, their experience holds important lessons:
- The centre is small and considers the network partners not as doers or passive actors. The network partners are expected to be innovators, to be creative in solving problems and proactive in the relationship.
- The centre demands more from partners than did their less effective counterparts in subcontracting. They put special emphasis on developing the competences of partners and have special staff to transfer knowledge to them.

The agenda of the central firm as presented by Lorenz and Baden-Fuller (1995) comprises four items that may also be valid for knowledge networks in the WSS sector:
- *The idea*. Creating a vision in which partners play a critical role.
- *The investment*. A strong brand image and effective systems and support.
- *The climate*. Creating an atmosphere of trust and reciprocity, with all members contributing all the time.
- *The partners*. Developing mechanisms for attracting and selecting partners.

Other forms of networking
WELL, the DfID Resource Centre Network (http://www.lboro.ac.uk/well/index.htm) is an example of a network made up of Northern and Southern partners. It acts as a resource centre for DfID staff and programmes but also has a broader role in knowledge sharing.

Another form of networking is provided by the Water Supply and Sanitation Collaborative Council (http://www.wsscc.org) which was established at the end of the Water Decade (1980-1990). During their bi-annual meeting face-to-face knowledge sharing takes place whereby government agencies, NGOs, the private sector and the donor community meet to discuss progress in the water sector.

Professional associations are also important knowledge networks. Some with particular use for the sector are the IWA http://www.iwahq.org.uk/ and AIDIS http://www.aidis.org.br. The annual meeting of AIDIS for example is a massive event in Latin America where many people involved in the WSS sector meet.

Some organisations in the WATSAN sector have a specific knowledge sharing component in their mandate, including for example IRC http://www.irc.nl and CEPIS http://www.cepis.ops-oms.org. They have a strong knowledge base that is accessible on line and they work with a large network of partners throughout the world.

Getting better at networking

Egger (2003) gives some suggestions for making networks successful, including the following:

- The network must *clearly define its thematic niche* by analysing the context. What knowledge is needed? What knowledge is available and what are other networks doing? Where is the knowledge missing? In addition, the partners should identify thematic areas where they have particular strengths.
- *Face-to-face meetings* are important to generate trust and to keep the community in a network alive. A rule of thumb is a meeting at least every year.
- It has to be accepted that, although partners should have the same rights and obligations, their situation is often very different in that some partners have more time and resources for the network than others. *Rotating the duties and responsibilities* in a network is a good option to reduce the influence of an individual or a small group of partners.
- Because of the complexity of international networks, *an official but small secretariat* is recommended. A node is needed for network co-ordination, where the actions of a network are brought together.
- For a network to succeed over the longer term, the relationships between the partners must be *mutually advantageous* without affecting the autonomy and independence of members.

It is important to add a number of suggestions to this list. Perhaps the most important is to critically evaluate the network on a regular basis. Key questions include:

- Is our added value growing or decreasing:
- Is there sufficient rate of return on the investments?
- Can we reduce cost by working smarter?
- Are the network partners satisfied?
- Do we need new (different) partners?

TOP Cases and examples

This section contains some cases and examples of KM and IM activities in the WASH sector. However, we would like you to share your experiences with us and we invite you to do so by sending an e-mail to Sascha de Graaf at graaf@irc.nl.

1. AGUASAN

AGUASAN is a community of practice (CoP) of Swiss practitioners from different organisations active in the field of drinking water supply and sanitation (WATSAN) in developing countries. They meet four times a year for one day in Bern (Switzerland) to share their experiences and news, and to get feedback on projects and new ideas.

The group is organised in a very informal way. Once a year some members organise the AGUASAN workshop week. These workshops are of a more innovative nature than the meetings that are held four times a year, and at every workshop one specific topic is explored in-depth. AGUASAN is an interesting example, being a CoP that has existed now for over 20 years (http://www.skat.ch).

They use only face-to-face meetings and they have no website or e-mail discussion group. Why is the group so successful? There is no simple answer. Factors that may have contributed to its success are the commitment of the AGUASAN members, the passion for the topic, and the resources (time and, by inference, money) available.

2. International Networks for Knowledge Sharing

Examples of international networks for knowledge sharing between organisations are:
- Rural Water Supply Network RWSN – http://www.rwsn.ch;
- CWG, the Collaborative Working Group on Solid Waste Management – http://cwgnet.net.

Various organisations and individuals from all over the world participate in these networks. They are more structured and institutionalised than CoPs, partners are sometimes also organisations as a whole and not only individuals and some networks are even legally registered. All networks use different tools for knowledge sharing like workshops, conferences, publications, websites, and discussion groups.

These networks contribute also to a trustful relationship between the network partners and this seems to be a precondition for carrying out projects in partnership. All three networks face different challenges such as adjusting to new trends in development cooperation, funding and management of the network, etc. For further information see http://www.skat.ch/publications.

3. ICT mediated knowledge networking in the Arab region

Four major lessons may be drawn from the still embryonic ICT mediated knowledge networking initiatives in the Arab region, implemented in the context of the UNDP supported Mediterranean Environmental Technical Assistance Program (METAP).

1.   Technology is not neutral

Most networks in the region are designed on the assumption that spontaneous interaction among network members would emerge after a virtual space (e.g., discussion forum or listserv) is built for them (i.e., "Build it and they will interact"). This however does not sufficiently address the expectations of the users.

The use of structured or semi-structured online learning activities (e.g., e-conferences, self-paced learning modules) revolving around the knowledge needs of the users, and led by respected experts could be one way of meeting the users' expectations. These activities, if designed properly, could provide the background for the subsequent emergence of more informal and spontaneous interaction online.

2.   Realistic objectives are needed

To improve its chances to respond to the knowledge needs of its members, the envisaged knowledge network must focus on clear objectives, such as catering to the knowledge needs of the stakeholders associated with the three pillars of METAP. This will avoid the problem of spreading available resources too thinly.

3.   Content development strategy needs to involve stakeholders

Most of the ICT-mediated networks in the region have been developed without a clear content development strategy in mind. As a result, the content available rarely changes and if it does it consists mainly of links to content that is developed for other purposes and for other regions of the world.

So local specific content needs to be developed, but this cannot be the business of the network moderator(s). Building partnerships with research institutions, development organisations, consulting firms, or NGOs with respect to the development of environmental content is needed. They thus need the capacity to capture, codify, and diffuse the knowledge generated through different projects.

4.   *Engagement strategy is also needed*

Having fresh (good quality) online content is not enough to ensure that network members will interact. They may simply download content without engaging in any online knowledge making or sharing event. Using regular newsletters, "hot topic" notices, and e-clips on issues that are relevant to the region may be one way of provoking the members' contributions online.

The success of the engagement strategy will also depend upon the network moderator's online facilitation skills to trigger debate through provocative questions.

4. Applying the knowledge value chain in AMREF, SEUF and IWSD (Pels and Odhiambo, 2005)

Staff from AMREF Flying Doctors, Kenya Country Office, Institute of Water and Sanitation Development (IWSD) in Zimbabwe and the Socio-Economic Unit Foundation (SEUF) in Kerala, India, participated in the KM Workshop in September 2003 at the Sixth Water Information Summit in Delft. They learned about different aspects of KM and the application of the Knowledge Value Chain.

Prior to the workshop they prepared themselves over a period of five weeks by taking part in a community of practice. Working online, they assessed their personal and organisational KM priorities, and drafted potential KM goals. In each organisation a small KM team was formed.

The face-to-face workshop helped participants to review a number of cases, share experiences and refine their KM goals and objectives. They drafted a practical KM plan with the assistance of staff from IRC, SKAT, and WEDC. They presented their plan to the other participants and to their directors who were in Delft for a parallel meeting.

KM Plan - SEUF
India's Socio-Economic Unit Foundation (SEUF) consists of six regional offices in Kerala State and has the ambition of becoming a leading resource centre in the region. They identified a lack of information sharing within SEUF as a major drawback in achieving their ambition and have developed two plans to address this.

KM Plan 1: Information sharing through SEUF website
- Use skills gained through the Learn@WELL (http://www.irc.nl/page/26332) writing skills module to provide quality material for the website;
- Repackage existing outputs to serve different online target groups; and
- Develop an inventory of staff skills, attitudes and experiences and use this to allocate responsibilities for website management and to inform organisational HR needs.

KM Plan 2: Internal information sharing through improved project documentation
- Make results and experiences from projects more explicit, thereby creating leverage for information sharing;
- Document proposal development;
- Create central project files; and
- Document project activities and outcomes.

For more information on SEUF's KM plans, contact Ms. Suma Matthews at seufhq@sify.com.

KM plan - AMREF Kenya Country Office
AMREF felt the need to scale-up the KM initiative within their head office and preferably wider, involving other AMREF country offices. Steps involved were:

- A KM scan as a baseline assessment of in-house KM practices. The scores of the scan will be compared with a second scoring after completion of the initiative
- Development of a KM plan in an internal workshop in AMREF, facilitated by staff from IRC and WEDC (Waterlines 25, June 2004)

For more information on AMREF's KM activities, contact David Mutethia, Gerald Rukunga at info@amrefke.org

KM plan - IWSD

A KM workshop was held at IWSD to provide an understanding of how KM can be used to leverage corporate knowledge to meet IWSD's vision, mission, and goals. A major exercise in the workshop was the development of KM plans. Fortunately, the high attendance by IWSD staff at the workshop has meant that it has been possible to develop four KM plans. The topics of each plan are mentioned in the table below.

Table 4: Topics of IWSD's KM plan

Thematic Groups	Strategic Issues
Research	Resource generation / Acquisition
Information and Marketing	Positioning / branding IWSD, Profile raising, Web-presence
Technical /Training	Product development, New work
Admin & Finance	Resource allocation / Transparency / Compliance

These topics reveal a common thread in the four proposed KM plans; and this is that they all address key strategic issues for the organisation.

For more information on IWSD's KM activities, contact Marjorie Kusotera (mkj@iwsd.co.zw) or Lovemore Mujuru (mujuru@iwsd.co.zw).

Some first lessons

Introducing KM in an organisation is like navigating in a sea whose extent is unknown. KM is very much subject to different interpretations of staff. Therefore it is helpful to agree on an organisational definition to limit the scope of the KM initiative.

SEUF is an organisation with regional offices, physically spread across Kerala State, India. Staff of these different regional offices have little opportunity to meet on a regular basis. They chose the website and intranet to store and share achievements and lessons learned. Furthermore, a beginning was made on making an inventory of staff competences.

A KM initiative needs both organisational and personal commitment and, in the case of AMREF, a big organisation, it was decided to start with a single department and, once lessons were learned there, to introduce them in other parts of the organisation.

The KM plans reveal that IWSD, a single office organisation, is strong on its experience and skills and weaker in its IM and process development. IWSD management could seize this opportunity to leverage KM within IWSD and embark on implementation as soon as possible, so as to maintain the momentum which has been generated.

Different organisations, different focus
The three organisations mentioned differ very much in type and also in focus on certain KM activities:

- AMREF is a big organisation (http://www.amref.org) with various country offices and 12 national offices in the North to support awareness and fundraising activities. During a KM workshop at AMREF Kenya country office it was decided to revitalize the existing KM group by AMREF HQ taking the lead in KM initiatives AMREF wide. With respect to the Weggeman model, they focussed on strategy and management buy-in.
- SEUF (http://www.seuf.org) is an organisation with regional offices. Practising with drawing up KM plans revealed that writing and documentation skills, next to a better ICT infrastructure, were the main bottlenecks. With respect to the Weggeman model, they focussed on skills, structure and sharing knowledge.
- IWSD (http://www.iwsd.co.zw) had the advantage of having almost all staff attending a KM workshop to create KM plans. Four existing thematic groups focussed on strategic issues to discuss what organisational change would improve performance. With respect to the Weggeman model, they addressed the whole matrix.

For more case studies look at the following websites:

- Summary of lessons learned during an IRC KM e-conference:
  http://www.irc.nl/page/14476:

- ICT-Enabled Development Case Studies by Bridges.org:
  http://www.bridges.org/iicd_casestudies/case_studies.html

- Knowledge for Development site: http://www.km4dev.org

- Knowledge for Development:
  http://www.knowledgefordevelopment.com/Teaching/KN/List_of_Resources.htm

TOP books, articles, papers

There is a lot of literature on experiences, from academic and "common sense" thinkers. So perhaps it is better to talk about personal favourites instead of the top ten. These favourites are on:

Personal KM

- Felder and Silverman (2002). *Learning and teaching styles in engineering education* (focussing on learning and teaching). Download the paper from: http://www.ncsu.edu/felder-public/Papers/LS-1988.pdf
- Richardson (2001). *The Practical Reality of Knowledge Management within Development Initiatives.* (focussing on personal behaviour and activities): Download the paper from: http://www.telecommons.com/reports.cfm?itemid=219
- Wheatley (2001). *The Real Work of Knowledge Management.* (focussing on people)

Networking

- KM4DEV community of practice (Knowledge management for development): many articles on KM and networking: http://km4dev.org and a free e-journal for which you can register

Organisational KM

- Binney (2001). *The Knowledge Management Spectrum: Understanding the KM field.* Very informative overview of KM applications and enabling technologies. Download the article from: http://www.km4dev.org/index.php/articles/downloads/315
- Collison, C. and Parcell, G. (2004). *Learning to fly : practical knowledge management from leading and learning organisations.* West Sussex, UK, Capstone Publishing. For more information: http://www.chriscollison.com/l2f/whatsinaname.html
- Nonaka, I. and H. Takeuchi (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation* New York, U.S., Oxford University Press
- Snowden (2001). *Narrative Patterns, the perils and possibilities of using story in organisations.* Very informative introduction to the use of narrative. Download the article from: http://www.kwork.org/Resources/narrative.pdf
- Snowden, D.J. (2002). 'Just in time management. Part 1. Recognizing common KM errors and the progress they inhibit'. In: *KM review*, vol. 5, no. 5, p. 14-17. Weggeman's Knowledge Value Chain: about linking KM to organisational management. The model is explained in a PowerPoint: http://www.irc.nl/page/8371. Also, some background information is available: http://www.irc.nl/page/8372.

On network KM / Knowledge Sharing

- SKAT's compilation of relevant issues on KM for the development sector International Networks for Knowledge Sharing, June 2003: http://www.skat.ch/publications (focussing on various forms of networking)

On learning organisations

- Senge. *The Firth Discipline: The art and practice of the learning organization* (1990) and *The Firth Discipline Fieldbook: Strategies and Tools for Building a Learning Organization* (1995). For more information: http://www.fieldbook.com/

TOP models and tools

A common sense approach – knowledge mapping

With a common sense approach it is possible to come a long way. Try building a picture of your organisation: How is it performing? What would you like to improve? When information and knowledge (workers) enter the organisation, what happens to it? Does it flow? Is it shared? Is it handled with care? Is information retrievable for those who need it? Do staff possess knowledge that currently is not used but could give you a boost?

Richardson (2001) (http://www.telecommons.com/reports.cfm?itemid=219) suggests to start with **knowledge mapping**, the process to describe what knowledge an organisation has, who has it and how it flows (or doesn't) through the enterprise. He distinguishes between the need to find out where what knowledge resides and to capture the patterns of information flow in the organisation.

In this context it is important to look at the different actor groups with different expertise in relation to the management of knowledge resources as mentioned in Section 4 "People".

The Knowledge Value Chain

A good framework to analyse and implement KM activities in an organisation is the Knowledge Value Chain (Figure 3) developed by Weggeman (2000). It very much helps to understand the complexity of the knowledge flow by dealing with it in smaller blocks.

This framework is presented in more detail in this TOP because it is found useful by IRC and several of its partners. The chain stresses the link with overall organisational goals and strategy (box 6), which allows for addressing the key question "knowledge to do what".

It comprises six phases (Weggeman 2000):
1. Determining the **needed knowledge** to realise the strategy to reach a specific goal;
2. Determining the **knowledge available** in the organisation, where it can be found and its quality;
3. **Developing the missing knowledge** to implement the strategy, posing amongst others the question of what knowledge can be developed inside the organisation and what needs to be brought in from outside;
4. **Sharing the developed knowledge** with those employees who need the knowledge to perform their job well;
5. **Using or applying the shared knowledge**, the ultimate purpose of the effort. (Talking about cycling is quite different from actually getting on a bike);
6. **Evaluating** the previous phases with an eye open for possible side effects and for spontaneous knowledge that has arisen and may be very relevant for achieving or adapting the strategy and the goals.

Mission /Vision	Knowledge			Share	Apply	Evaluate
Goal(s)	**Needed**	**Available**	**Develop**	Knowledge		
Strategy						
Culture						
Management style						
Staff						
Structure						
Systems						

Figure 3. The Knowledge Value Chain (Weggeman 2000)

Each phase is completed with a concrete result that is documented and shared. The first three phases focus on gaining insight into the available and needed knowledge (information, experience, skills and attitudes) to achieve what you want.

This strategic process produces a clear and shared picture of what is available and what needs to be acquired or developed. It is best exercised first with a modest goal.

The fourth phase concerns the question of how the organisation enables the sharing of developed or acquired knowledge with those co-workers that need it to fulfil their tasks in a better way.

Box 6 Relation between mission, vision, goal and strategy (Weggeman, 2000)

The collective ambition of an organisation comprises the:
- **Mission**, the why, indicating the reason why the organisation exists and needs to be sustained. An organisation has one overriding mission that applies for all parts of the organisation.
- **Vision**, where it wants to go, indicating the long term perspective it wants to achieve. It is only possible to have one vision per part or unit in the organisation.

To strive for this collective ambition the organisation has:
- **Goals**, the what, the measurable results it wants to obtain in a given time frame. Each unit in the organisation may have several specific goals.
- **Strategy**, the action plan that indicates how each of the goals (results) will be achieved.

The fifth phase concerns applying knowledge in daily work (usually within specific assignments). This is where knowledge workers capitalise on their information, their experience, their skills and attitude in order to make their jobs and tasks successful.

Several factors hinder the application of new knowledge. These include "pigeon holing", the tendency of a knowledge worker to define a problem in terms of the solutions that he/she can offer and "defensive routines". The latter refers to defending your own position or your indispensability, by searching for new areas of application that your methods, techniques and skills have mastered before (Keuls, 2003).

The last phase in the chain concerns the evaluation of the way the other phases were carried out, how they can be improved and how to develop an organisational learning process that leads to better results. So the cycle is closed with a reflection on what has been done and may lead to re-applying the cycle but also to adjustment in goals and strategies. http://www.ispi.org/publications/pitocs/piSept2003/Vol42_08_43.pdf

Getting the best out of the Knowledge Value Chain
To help identify where the strengthening of KM may give greatest benefit, the chain is presented as a matrix that comprises the six phases on one axis and six basic design parameters of an organisation, based on the McKinsey's 7S Framework, on the other (http://www.themanager.org/Models/7S%20Model.htm).

The six design parameters are:
- **Strategy**, the plan of action to achieve the specific goal (in measurable terms). Importantly this includes specific KM activities, developed in a participatory way, with all knowledge levels in the organisation.
- *Culture (***Shared Values***)*, the way staff behave and their attitude to KM.
- *Management style,* the **Style** of management and their commitment to KM.
- **Staff,** the different groups of people with their own characteristics that make up the organisation and with their different **Skills.**
- **Structure**, the way tasks are distributed and coordinated.
- **Systems**, referring to the ICT infrastructure and the related procedures.

The matrix (Figure 3) helps to systematically assess which interventions are most suitable. Just a few examples:

- If our strategy to reach a specific goal is not clear enough to identify what knowledge we need to implement it, we have to clarify the strategy, bringing in specific KM aspects.
- The structure of an organisation may promote working in separated silo's that do not communicate, thus loosing opportunities from contacts between different disciplines.
- The available information technology may not allow staff to easily set up a community of practice to share and develop information. E-mail may have become overly time consuming thus reducing efficiency.
- The management may pay lip service to KM, but not actively support it.
- Staff may need to learn more about the application of different KM tools, to be able to better share information.

From the model it is clear that information technology is only one (small) element; a website or intranet is a system to sustain knowledge sharing. Much can be done to improve KM by influencing the other variables. The essence is to start with the link in the chain with the largest potential in terms of achievability and effect.

The model is useful, but not a panacea. It has a number of limitations: it does not address the flow of information through an organisation in a more general sense, nor does it

address the issue of validation, once knowledge is located. This may, for example, require an organisation to have special staff (infomediaries) to ensure that information is correct, concise and properly indexed.

Other approaches and tools

The Specialist Library on KM contains a toolbox with tools for different aspects of KM: http://www.nelh.nhs.uk/knowledge_management/km2/toolkit.asp

TOP websites

In this section a number of interesting web sites are listed in alphabetical order with a brief description. It should be realised that these web sites change quickly so you will have to visit them to get the latest information.

The Gurteen Knowledge Website
http://www.gurteen.com
This site has many interesting articles on KM that are downloadable. You do not need to be a member to access any part of the site or to subscribe to any of the services provided. The Gurteen Knowledge Community is a global learning community of over 12,000 people in 138 countries across the world.

Helvetas
http://www.helvetas.ch/
Helvetas started its KM initiative in 2000. A series of reasons lead to this effort: mainly the conversion of society into the information society and consequently the shift of our field of work in general, and Helvetas in particular, towards a knowledge based organisation, where expertise becomes the core resource. Thus the optimised usage (and management) of this resource – including its creation, capturing, evolving and sharing – becomes decisive.

IRC website
http://www.irc.nl/km
In the development sector KM is seen as a promising way forward. In this section you will find resources on KM and results from practical application of KM. For instance, the Weggeman Knowledge Value Chain model is explained here. Over time this section of the IRC web site will be further elaborated.

Knowledge Board
http://www.knowledgeboard.com/community/zones/sig/kmngo.html
Community of Practice KM Europe. KnowledgeBoard, the online community to create a global exchange of KM expertise and interest.

Knowledge Connections
http://www.skyrme.com/index.htm
This site is a place to gain insights into the networked knowledge economy and help in creating successful KM and Internet commerce strategies

Knowledge Management for Development
http://km4dev.org
The site provides a platform for a community of international development practitioners who are interested in KM and knowledge sharing issues. It also contains FAQ, documents and a journal on KM.

Knowledge Management Specialist Libraries (National Electronic Library for Health)

http://www.nelh.nhs.uk/knowledge_management/km2/getting_started.asp

Interesting, easy-to-read articles on many different aspects of KM. Includes a toolkit.

Knowledge scan

http://www.provenbenchmark.nl/custom-scans/kmscans/.

Here you will find tools to do a KM scan.

Michael Polanyi and tacit knowledge (Infed)

http://www.infed.org/thinkers/polanyi.htm

Michael Polanyi helped to deepen our appreciation of the contribution of 'tacit knowing' to the generation of new understandings and social and scientific discovery.

Society for organisational learning

http://www.solonline.org/

Web site about learning organisations/organisational learning.

Storytelling: Passport to the 21st century

http://www.creatingthe21stcentury.org/index.html

Website about the purposeful use of narrative to achieve a practical outcome with an individual, a community, or an organisation.

Sveiby Knowledge Associates

http://www.sveiby.com/faq.html

FAQ's by Sveiby, principal of a global network of consultants, SKA, Sveiby Knowledge Associates (http://skaglobal.com) and professor in KM at the Swedish Business School Hanken in Helsinki.

TOP contacts

There are many people working in this field, hence instead of making a list we have the following suggestions:

KM4DEV: A good place to start is the KM4DEV community. KM4DEV stands for Knowledge management for Development. You can reach them at http://www.km4dev.org. Here you can pose a specific question that will reach out to a wide range of people involved in this Community of Practice. With specific questions you may also try to approach the different authors cited in this paper. Other people involved in KM are mentioned below.

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About IRC

IRC facilitates the sharing, promotion and use of knowledge so that governments, professionals and organisations can better support poor men, women and children in developing countries to obtain water and sanitation services they will use and maintain. It does this by improving the information and knowledge base of the sector and by strengthening sector resource centres in the South.

As a gateway to quality information, the IRC maintains a Documentation Unit and a web site with a weekly news service, and produces publications in English, French, Spanish and Portuguese both in print and electronically. It also offers training and experience-based learning activities, advisory and evaluation services, applied research and learning projects in Asia, Africa and Latin America; and conducts advocacy activities for the sector as a whole. Topics include community management, gender and equity, institutional development, integrated water resources management, school sanitation, and hygiene promotion.

IRC staff work as facilitators in helping people make their own decisions; are equal partners with sector professionals from the South; stimulate dialogue among all parties to create trust and promote change; and create a learning environment to develop better alternatives.

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