# Knowledge Management for teams and Projects

## Chapter 1. Principles of knowledge management

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### INTRODUCTION

It is traditional to start a book of this type with the discussion of 'what is knowledge', and 'what is knowledge management'. If you are already quite clear about the distinction, then this chapter is not for you. However, there is often still some confusion over the definitions of, and fuzzy boundaries between, knowledge management, information management and data management. The two latter disciplines are well established; people know what they mean, people are trained in them, there are plenty of reference books to explain what they are and how they work. *Knowledge management*, on the other hand, is a relatively new term, and one that requires a little bit of explanation. If you would rather jump on to the practical applications, then start at Chapter 2, and come back to Chapter 1 another day.

We will start by looking at 'what is knowledge'.

### What is knowledge?

Knowledge is something which only humans can possess. People know things, computers can't know things. Traditionally, in our schooling system and in many organisations, knowledge is seen as a personal possession. If you are a knowledgeable person, you have status and you are in demand. Knowledge gives you the ability to take action. Knowledge is based on experience, it requires information, and it involves the application of theory or heuristics[1] (either consciously or unconsciously), and it allows you to make knowledgeable decisions. Knowledge has something which data and information lack, and those extra ingredients are the experience and the heuristics (Figure 1.1).

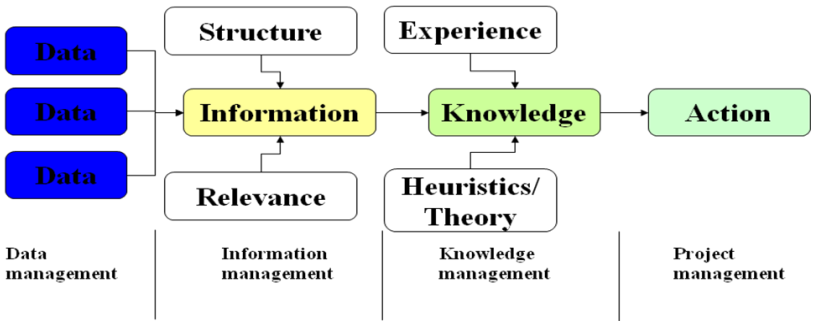



**Figure 0-1.1**

As an illustration, consider the link between data, information and knowledge as they are involved in decision-making in a mining exploration company.

The company pays for a mineralogy survey, taking samples across an area of mountainous country. Each sample is analysed, and each is a datapoint. These data are held in a database.

In order for these data to be interpreted, they need to be presented in a meaningful way. The company uses a Geographical Information System to present the data in map form. A contour map of the mineralogical data represents information, showing the pattern of changes in the mineralogy across the mountain belt.

However, this map needs to be interpreted. Such information, even presented in map form, is meaningless to the layman, but an experienced mining geologist can look at it, apply their experience, use some theory, heuristics or rules of thumb, and can make a decision. That decision may be to conduct some further sampling, to open a mine, or to dismiss the area as unprospective.

The mining geologist has 'know-how' – he or she knows how to interpret contour maps of mineralogical data. They can use that knowledge to take information (presented in the map), and decide which action to take. That know-how is developed from training, from years of experience, through the acquisition of a set of heuristics and working models, and through many conference and bar-room conversations with the wider community of mining geologists.

Knowledge which leads to action is 'know-how'. Your experience, and the theories and heuristics to which you have access, allow you to know what to do, and to know how to do it. In this book, you can use the terms 'knowledge' and 'know-how' interchangeably.

In large organisations, and in organisations where people work in teams and networks, knowledge and know-how are increasingly being seen as a communal possession, rather than an individual possession. Communities of practice (section 4.2.3) are networks of people who have collective ownership of knowledge. such knowledge is 'common knowledge' – the things that 'everybody knows'. This common knowledge is based on shared experiences, and on collective theory and heuristics that are defined, agreed and validated by the community.

Shared experience is often hard to codify, and is transferred within a project by communication and learning meetings, and between projects by processes such as peer assists, technical limit, optioneering, and action learning (all of which are described in this book). The theories and heuristics can be written down and codified into case histories, lessons learned, project best practices, and (ultimately) company policies and standards. This codification process will be described later.

## Tacit and explicit knowledge

The terms *tacit* and *explicit* are often used when talking about knowledge. The original authors, Nonaka and Takeuchi (1995) use these terms to define 'unable to be expressed' and 'able to be expressed' respectively. Thus, in the original usage, tacit knowledge means knowledge held instinctively, in the unconscious mind and in the muscle memory, which cannot be transferred in words alone. Knowledge of how to ride a bicycle, for example, is tacit knowledge, as it is almost impossible to explain verbally.

Nowadays these original definitions have become blurred, and tacit and explicit are often used to describe 'knowledge which has not been codified' and 'knowledge which has been codified' (or 'head knowledge' and 'recorded knowledge' respectively). This latter definition is a more useful one in the context of knowledge management within projects, as it defines knowledge based on where it exists, rather than on its intrinsic codifiability. So, knowledge which exists only in people's heads is termed *tacit knowledge*, and knowledge which has been recorded somewhere is termed *explicit knowledge*.

There is a wide range of types of knowledge, from easily codifiable to completely uncodifiable. Some know-how, such as how to cook a pizza, can be codified and written down; indeed, most households contain codified cooking knowledge (cookery books). Other know-how, such as how to ride a bicycle, cannot be codified, and there would be no point in trying to teach someone to ride a bike by giving them a book on the subject.

Project knowledge sits in the middle of the graph in Figure 1.2. Some of it can be codified, some can't. Some can be captured and made explicit, some can't. This assertion has implications for how project knowledge will be managed, because it means we need to address both the tacit and explicit dimensions.

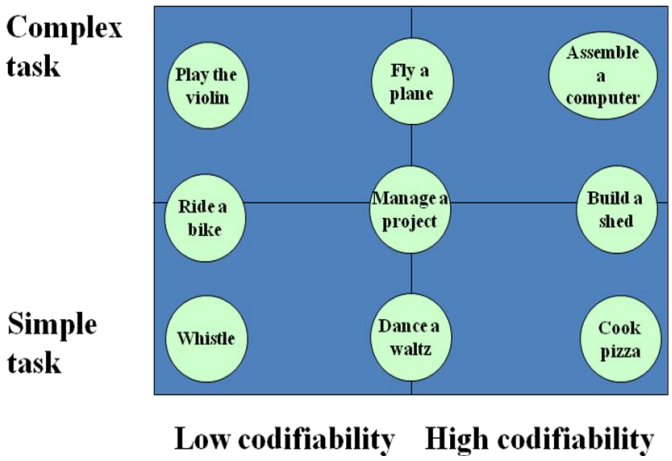



**Figure 1-2**

## What is knowledge management?

If knowledge is a combination of experience, theory and heuristics, developed by an individual or a community of practice, which allows decisions to be made and correct actions to be taken, then what is

knowledge management? Larry Prusak,of McKinsey Consulting, says 'It is the attempt to recognise what is essentially a human asset buried in the minds of individuals, and leverage it into a corporate asset that can be used by a broader set of individuals, on whose decisions the firm depends' (Prusak, verb comm.). Larry is here suggesting that the shift from seeing knowledge as personal property, to seeing knowledge is communal property, is at the heart of knowledge management. To ensure management discipline, we need to make sure that this is done systematically, routinely and in service of business strategy.

Gorelick *et al.* (2004) suggest that 'knowledge management is fundamentally a systematic approach for optimising the access, for individuals and teams within an organisation, to relevant actionable advice, knowledge and experience from elsewhere'. This definition is similar to that of Prusak, although it looks at knowledge from the point of view of the knowledge user rather than the knowledge supplier. It also emphasises the need for the knowledge to be relevant and actionable, and therefore valuable to the knowledge user.

If you read widely about knowledge management, or attend many of the conferences, you will discover that for many people, 'knowledge management' is currently not a popular term. Some people challenge whether knowledge could ever be managed. They point to the intangible tacit nature of knowledge, the difficulty of separating knowledge from people, the difficulty of measuring the flow of knowledge, and suggest that this makes knowledge effectively unmanageable. Terms like 'knowledge sharing', 'systematic learning', 'shared learning' are often proposed instead.

However, modern businesses are becoming increasingly familiar with the practice of managing intangibles. Risk management, customer relations management, safety management, and brand management are all recognised management approaches. Knowledge is not significantly less tangible or measurable than risk, brand, or safety, and the term 'management' suggests a healthy level of rigour and business focus. The value of a brand is enormous, and therefore brands need to be managed. The value of corporate knowledge is also enormous, so why should that value not also be managed? Brand, reputation, knowledge, customer base etc, are intangible assets with great value to the organisation, and to leave these assets unmanaged would seem to be foolish in the extreme.

The terminology you use, however, is less important than the approach you take. If people don't like the term 'knowledge management', then you can avoid using the term initially. However, there is no need to be apologetic about applying the term 'management' to knowledge, and the term 'knowledge management' is a useful reminder, when knowledge sharing has proven its value, that knowledge needs to be captured, shared and applied with a degree of managed rigour.

## KNOWLEDGE MANAGEMENT MODELS

In this section we will look at some simple models for the management of knowledge, and develop a 12-component model that looks at the stock and flow of knowledge, and some of the enabling factors that need to be in place to enable the flow and replenish the stock. Some of the ideas and models introduced here will be built upon through the rest of the book.

### Knowledge suppliers and users

The definitions presented in the previous section imply the existence of suppliers of knowledge, and users of knowledge; people in whose minds the knowledge is buried, and people and teams who need access to that knowledge.

Knowledge is created through experience, and through the reflection on experience in order to derive guidelines, rules, theories, heuristics and doctrines. Knowledge may be created by individuals, through reflecting on their own experience, or it may be created by teams reflecting on team experience. It may also be created by experts or communities of practice reflecting on experience for many individuals and teams across an organisation. The individuals, teams and communities who do this reflecting can be considered as 'knowledge suppliers'.

In business activity, knowledge is applied by individuals and teams. They can apply their own personal knowledge and experience, or they can look elsewhere for knowledge – to learn before they start. The more knowledgeable they are at the start of the activity or project, the more likely they are to avoid mistakes, repeat good practice, and avoid risk. These people are 'knowledge users'.

We have introduced the idea of tacit knowledge and explicit knowledge. The knowledge can be transferred from the supplier to the user tacitly, through dialogue, or explicitly, through codifying the knowledge. Figure 1.3 shows these two approaches, by looking at the two places where knowledge can be stored: in people's heads, or in codified form in some sort of 'knowledge bank'. These two stores can be connected in four ways:

- direct transfer of knowledge from person to person (communication);

- transfer of knowledge from people to the 'knowledge bank' (knowledge capture);
- organisation of knowledge within the knowledge bank (organisation);
- transfer of knowledge from the 'knowledge bank' back to people (access and retrieval).

Knowledge can therefore flow from supplier to user (from person to person, or team to team) in two ways.

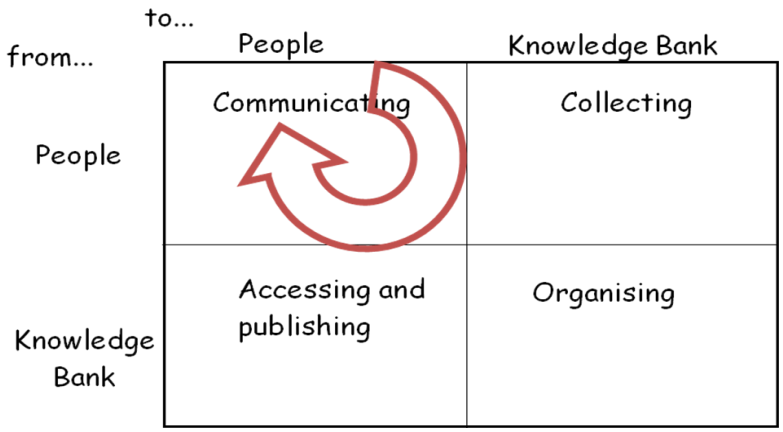



Figure 1-3

The most direct (the upper left arrow on Figure 1.3) is through direct communication and dialogue. Face to face dialogue, or e-mail discussion, is an extremely effective means of knowledge transfer. This method allows vast amounts of detailed knowledge to be transferred, and the context for that knowledge to be explored. It allows direct coaching, observation and demonstration, However, it is very localised. The transfer takes place in one place at one time, involving only the people in the conversation.[2] For all its effectiveness as a transfer method, it is not efficient. For direct communication and dialogue to be the only knowledge transfer mechanism within an organisation, would require a high level of travel and discussion, and may only be practical in a small company working out of a single office where travel is not an issue. This may be the only practical approach to the transfer of uncodifable knowledge (teaching someone to ride a bicycle can only be done face to face). However, it should not be the only mechanism of knowledge transfer, nor should knowledge be stored only as tacit knowledge in people's heads. Using people's memories as the primary place for storing knowledge is a very risky strategy. Memories are unreliable, people forget, misremember, or post-rationalise. People leave the company, retire, or join the competition. For example, what is the staff turnover in your team? Your division? Your company? How much knowledge is leaving your organisation in the heads of the departing people? There needs to be a more secure storage mechanism for crucial knowledge, and a more efficient means of transfer than just dialogue.

The less direct flow of knowledge (the larger, lower right arrow on Figure 1.3) is through codification and capture of the knowledge, storage in some sort of 'knowledge bank', and retrieval of the knowledge when needed. The transfer is lower bandwidth than direct communication, as it is difficult to write down more than a fragment of what you know. No dialogue is possible, and demonstrations are restricted to video files. Transfer of knowledge by this means is not very effective. However, the knowledge can be captured once, and accessed hundreds of times, so it is an efficient method of transferring knowledge widely. The knowledge is secure against memory loss, or loss of personnel. This approach is ideal for codifiable knowledge with a wide user base. For example, the widespread transfer of cooking knowledge is best done through publishing cookery books. It is also ideal for knowledge that is used intermittently, such as knowledge of office moves, or knowledge of major acquisitions. These events may not happen again for a few years, by which time the individuals involved will have forgotten the details of what happened, if it is not captured and stored.

These two approaches to knowledge transfer are sometimes called the *connect* approach (the smaller arrow), where knowledge is transferred by connecting people, and the *collect* approach (the larger arrow), where knowledge is transferred by collecting, storing, organising and retrieving it). Each method has advantages and disadvantages, as summarised in Table 1.1. Effective knowledge management strategies need to address both these methods of knowledge transfer. Each has its place, each complements the other.

## People, process, technology and culture

Systems for managing anything need to address the triple aspects of people, process and technology (see Figure 1.4). Each of these is a key enabler for any management system.

For example, a financial management system requires people (accountants, financial managers, commercial managers), processes (budgeting, accounting, financial auditing), and technology (SAP, Sage, Quicken, spreadsheets, calculators).

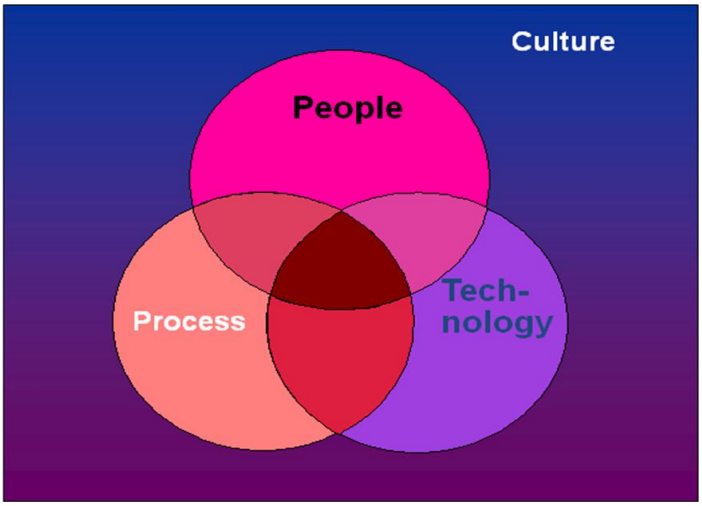


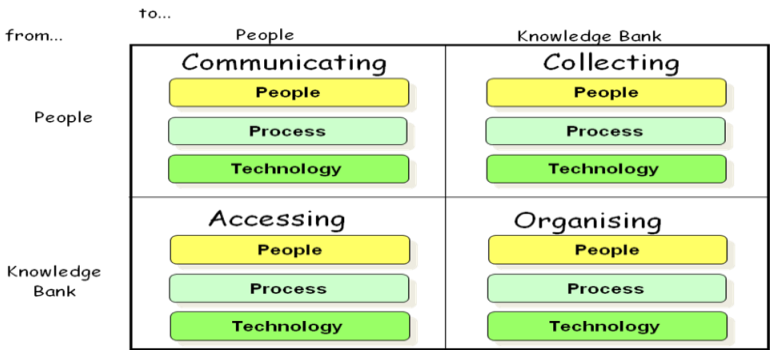

Figure 1-4

Similarly, a knowledge management system needs people to be assigned roles and responsibilities; processes for knowledge identification, capture, access and sharing; and technology for the storage, organisation and retrieval of knowledge.

These systems of people, processes and technology will operate within a corporate culture, which needs to support the system. Financial management systems will work in a culture where money is seen to be important, where money is treated as company property rather than the property of the team or project, where wasting money is seen as a bad thing, and where a project is not seen as being properly managed unless financial management is up to standard. Similarly, knowledge management systems will work in a culture where knowledge is seen to be important, where knowledge is treated as company property rather than the property of the team or project, where wasting knowledge is seen as a bad thing, and where a project is not seen as being properly managed unless knowledge management is up to standard. See the final section of this chapter for more discussion of the cultural issues.

## Knoco Ltd 12 box framework

The models presented in the previous two sections can be combined into a 12-component framework for a knowledge management system. The three enablers of people, process and technology (Figure 1.4) operate within each of the four boxes of knowledge flow (Figure 1.3) as shown in Figure 1.5.



This combination gives a 12-component framework for a knowledge management system, including:

1. people and communities with a role for communicating knowledge through discussion and dialogue;
2. structured process of knowledge exchange through dialogue;
3. communication technologies;
4. people with a role and skills for knowledge capture;
5. processes for knowledge capture;
6. technology for capturing knowledge;
7. people with a role and skills for distilling, packaging and organising captured knowledge;
8. processes for distilling, validating, packaging etc;
9. technology for storing and presenting organised knowledge;
10. people with a role for finding knowledge or publishing new knowledge;
11. processes to ensure new knowledge is sought and published;
12. technologies for finding explicit knowledge.

If all of these 12 components are present in a knowledge management system, then the system is complete and covers all components necessary for knowledge transfer. If any of the components are missing (e.g., nobody accountable for collecting knowledge, no process for retrieval, no technology for storage), then the system will not work properly, and the flow of knowledge will be interrupted. We have been using this copyrighted 12-component framework in Knoco Ltd for several years now, and it has proven to be a robust and comprehensive framework. We will refer to this framework later in this book, when discussing the effectiveness of knowledge transfer systems (Chapter 5).

## The 'learning before, during and after' model

The models presented in Figures 1.3–1.5 address the flow of knowledge from supplier to user, and the components that need to be in place to allow this to happen. Figure 1.6 introduces one further model, which describes how knowledge management activities can fit within the cycle of business activity.

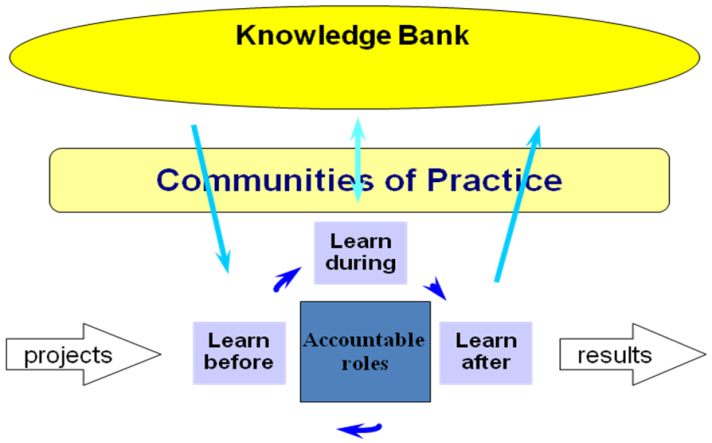



Figure 1.6

The management of knowledge, like the management of anything else, needs to be systematic rather than ad hoc, and needs to be tied into the business cycle. In any project-focused business, where business activities (projects) have a beginning and an end, knowledge can be addressed at three points. You can learn at the start of the project, so that the project begins from a state of complete knowledge ('learning before'). You can learn during the project, so that plans can be changed and adapted as new knowledge becomes available ('learning during'). Finally, you can learn at the end of the project, so that knowledge is captured for future use ('learning after'). The people and teams who manage the projects can use knowledge to improve their results and reach their goals. This model of 'learn before, during and after' was developed in BP during the 1990s, and I remember drawing the first embryonic version of this model in Shepperton, UK, in 1997. The 'learn before, during and after' cycle also appears to have been developed independently in several other organisations.

However, there is more to the model than just the 'learn before, during and after' cycle. The knowledge generated from the project needs to be stored somewhere, in some sort of knowledge bank.

Knowledge can be deposited in the bank at the end of the project, and accessed from the bank at the start of the next project. Knowledge packaged and stored in the knowledge bank can be considered to be knowledge assets.

The final components of the framework are the people components. Communities of practice need to be established to create and manage the knowledge assets. Knowledge roles need to be created in the projects, to make sure that knowledge management is embedded in the business activity. Without knowledge roles, knowledge management becomes 'everyone's job', and very quickly reverts to being nobody's job.[3]

This six component model (learning before, learning during, learning after, building knowledge assets, building communities of practice, and establishing business roles) is a robust model which creates value wherever it is applied.

## Types of knowledge transfer

There is no one-size-fits-all solution for knowledge transfer, because not every transfer context is the same. One of the prime differentiators between knowledge types is the relationship between the project that supplies the knowledge, and the project that needs the knowledge. Figure 1.7 shows three types of relationship.

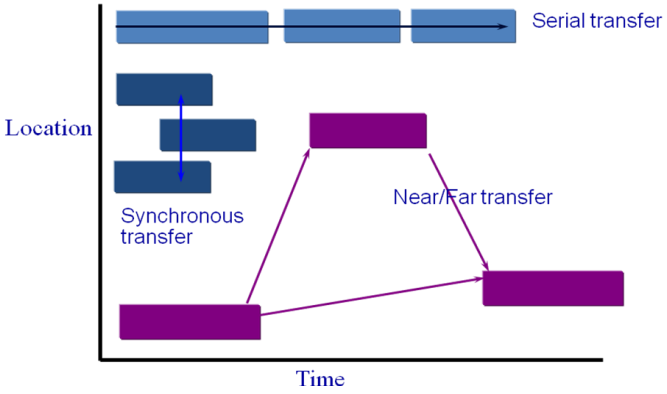



Figure 1.7

This figure plots projects as bars of activity in time and space (location). So, for example, the three black projects are overlapping in time, but taking place in different locations. The three cross-hatched projects are in the same location, but occurring in sequence. The three grey projects are all in different places, with no overlap in time.

- The transfer of knowledge within a series of projects in the same location (and therefore probably with the same team) is called *serial transfer*. Much serial transfer can be accomplished by the transfer of project plans, designs, basis of design documents, and so on, as well as by transferring lessons, and transferring core team members.
- The transfer of knowledge between a series of projects running simultaneously but in different locations is called *parallel transfer*. This can rely heavily on face-to-face activities such as *peer assist*, and *knowledge visits*, as well as real-time transfer of knowledge through communities of practice and online forums. Because operations are continuous, much knowledge can remain tacit.
- The transfer of knowledge between projects running in different times and different places is called *near transfer* or *far transfer*, depending on whether the knowledge will be applied in a very similar context (near transfer), or in a different context (far transfer). Near and far transfer cannot rely on real-time conversations, or on simply transferring project plans, as the next project may take place in a completely different country in several years time. Knowledge will need to be transferred in a written form as a knowledge asset. *Near* and *far transfer* are terms coined by Nancy Dixon (2000), and are discussed in much more detail in Chapter 4).

It is very helpful to assess the types of knowledge transfer you need, before putting in place a knowledge management programme.

# THE BUSINESS NEED FOR KNOWLEDGE MANAGEMENT

This section looks at the business justification for knowledge management, and where some of the value may lie. It also addresses the identification of the crucial knowledge that needs to be managed,[4] and looks at the lifecycle of knowledge within an organisation.

Business justification is crucial. If you can't clearly articulate the need for knowledge management you should not be doing it, because then you will be unclear about why you're doing it. You shouldn't be doing knowledge management because you think it's a cool, good or fashionable thing to do. You should be able to clearly outline the business reason for doing it. This section outlines two business reasons for managing knowledge: reducing the learning curve, and bringing everybody up to the benchmark.

## Knowledge and Performance

There is an old saying – 'It's easy when you know how'.

Any task is easy to perform, if you have the know-how. Knowledge management consists of making sure that the teams and individuals have the know-how they need, to make their task easier and to improve their performance. Knowledge feeds performance, and knowledge is also derived from performance. If your performance on a task or project is better than it was the previous time, then you have learned something. Your know-how has increased, and that know-how should be identified, analysed, codified (if possible) and disseminated to other teams. The higher your level of knowledge, the higher your level of performance. You learn from performance, and you perform by applying the knowledge you have learned. (The word 'you' in this paragraph can be singular, referring to an individual, or collective, referring to a project team or community of practice). Performance and learning can form a closed loop.

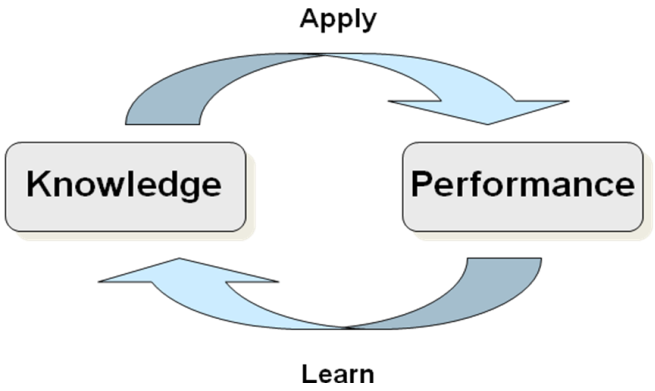



Figure 1.8

The knowledge/performance loop shown in Figure 1.8 shows the close link between these two elements, and it is fairly obvious from this link that knowledge management and performance management are also strongly linked. Knowledge management is far easier to apply in an organisation with good consistent performance metrics, a performance culture, performance measurement, reporting and target setting, and internal benchmarking. In an organisation like this, the effects of increased knowledge will be obvious, and the suppliers of knowledge (the higher performers) can be identified, as well as the customers for that knowledge (the lower performers).

Where performance is less easy to measure, knowledge management can still be applied, but it will be more difficult to make it systematic and embedded in the business process, and it will be considerably more difficult to measure the benefits.

Your knowledge management system and your performance management system should be aligned; they should operate on the same scale and to the same frequency. Generally, the periodicity of target setting and performance measuring should match the periodicity of learning and review. If targets are set for processes that take a few hours to a day (as in the technical limit process described in Chapter 3), then learning should be reviewed on a daily basis. If targets are set on a monthly basis, than they should be reviewed, and learning collected, on a monthly basis.

## The learning curve

The concept of the learning curve is well-established. The longer you do something, and the more times you repeat something, the better you get. A team that works together on a series of projects will find that over time, they get better, the budgets come down, and the durations of the projects decrease. This is shown in diagrammatic form in Figure 1.9a.

Figure 1.9a represents a project team which runs a programme of six projects. Over time they get better at these types of projects, and the costs (perhaps in terms of man-hours spent) come down. By the time they get to the fifth and sixth project, they have reached their minimum cost, and are working at their maximum efficiency. The only thing that they have at the end of this curve, which they did not have at the

beginning, is knowledge. They have gained know-how, experience, guidelines and heuristics for running this sort of project.

If they manage their knowledge by concentrating on 'learning during' the programme, and transferring the knowledge from one project to the next, they may be able to learn faster. This is shown diagrammatically as shown in the solid bars in Figure 9b. Here the overall cost of the programme of six projects has been reduced (by 8 per cent) by steepening the learning curve.

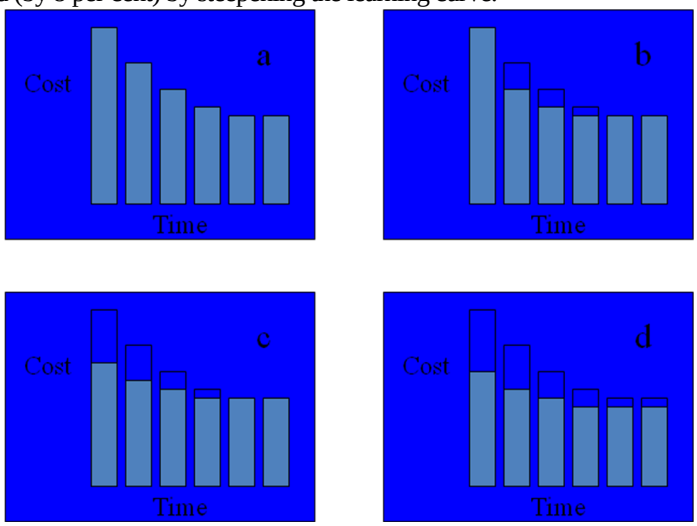



Figure 1.9

If they also 'learn before' the programme, by bringing in knowledge and experience from similar previous programmes, then they don't have to start at the top of the learning curve. Figure 1.9c shows a 16 per cent reduction for the overall cost of the six projects, by learning before the first project, and learning through the project sequence. What often happens, however, is that this focus on learning will also drive innovation, and improvements in maximum efficiency may result. The teams may exceed the maximum performance they otherwise would have achieved, as shown in Figure 9d, where overall cost savings of 24 per cent have been achieved.

In BP drilling programmes, statistics suggest that the application of knowledge during a programme of multiple drilling projects, as in Figure 1.9b, results in measurable steepening of the learning curve, and average cost savings of 7 per cent.

## Benchmarking

Another way to look at the value of knowledge management, is to look at the transfer of best practices from one part of the business to another, as shown in Figure 1.10.

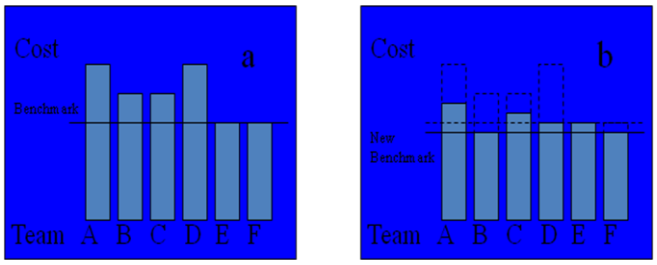



Figure 1.10

If you can measure and compare the performance of different teams in business units, you can identify the better performers and the poorer performance. For example, Figure 1.10a shows the cost performance for six different teams. High costs equate to poor performance.

Teams E and F are the best performers, operating at benchmark costs, and A and D are the worst. If all of these teams exchange knowledge, and the poorer performers learn from the better performers, then the overall performance should improve, as shown in Figure 1.10b. All the teams except E have improved, and B and F have set a new benchmark. Considerable costs have been cut out of the system.

What frequently happens is that the better performers find that even they have things to learn, and the collective benchmark performance often improves. The cost improvement shown in Figure 1.10b, over all six teams, is 22 per cent.

Internal benchmarking can therefore be a powerful means of measuring the value of knowledge management, and of identifying the knowledge suppliers and the knowledge users (in Figure 1.10a, teams E and F are primarily knowledge suppliers, and teams A through D are knowledge users, although to an extent all teams both supply and use knowledge).

## Which knowledge?

The models shown in the previous two sections describe where the business value of knowledge lies, but not all knowledge is of equal value. Some knowledge will be crucial to your business, and some will be largely irrelevant. Some knowledge drives your core competencies, while some can be conveniently outsourced. One key component of setting your knowledge management strategy within a business, or your knowledge management plan for a project, is to define *which knowledge* – which knowledge is needed, which knowledge needs to be acquired, which knowledge will be generated, which knowledge needs to be captured and codified etc (see Chapter 5 for a discussion of knowledge management plans).

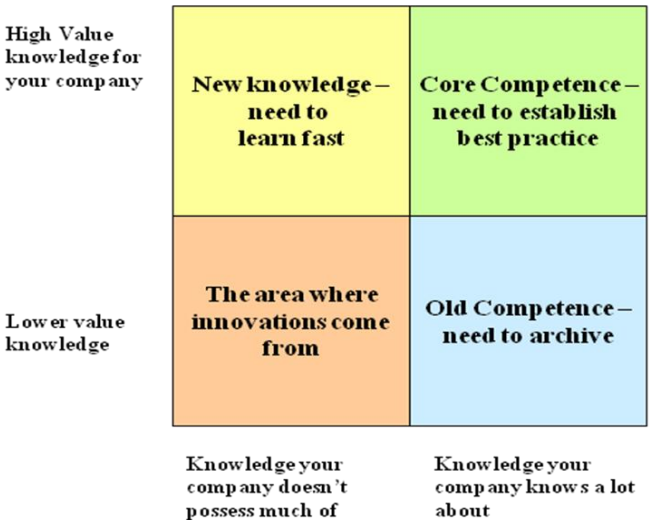



Figure 1.11

Figure 1.11 shows a framework for deciding which knowledge to address, and how to manage it. You can start to divide knowledge topics into four areas if you look at two components: the level of in-house knowledge that currently exists, and the level of in-house need for that knowledge.

Where there is a high business need for the knowledge, but the level of in-house knowledge is not yet very high, then you are at the top of the learning curve, and your focus should be on rapid learning.

Where there is a high business need for the knowledge, and the level of in-house knowledge is high, then you are looking at areas of core competence, and your focus should be on development and implementation of best practice and standards.

Where there is a low business need for the knowledge, and the level of in-house knowledge is high, then you are looking at areas of old knowledge, and your focus should be on archiving this knowledge in case it is needed again in future.

Where there is a low business need for the knowledge, and the level of in-house knowledge is also low, then you might consider that this is an area of no interest in terms of knowledge management. However, it is often from this area that the new innovations arise, and areas of new technology are generated, which need to be pushed up into the 'learn rapidly' box.

An early step in development of the business knowledge management strategy, or a project knowledge management plan, is to identify the key knowledge areas and plot them on a matrix such as Figure 1.11.

## APPROACHES TO KM

The more widely you read around the topic of knowledge management, the more knowledge managers you meet, and the more conferences you attend, the more you will come to realise that there are many approaches

to managing knowledge. This section introduces some of these approaches, and makes the case for a holistic and systematic approach as described above.

## The default approach

The default approach which many companies use, is to keep knowledge in people's heads, and to manage the knowledge by managing the people. Knowledge is owned by the experts and the experienced people. Knowledge is imported to projects by assigning experienced people as members of the project team. Knowledge is transferred from site to site by transferring staff, and by using company experts who fly around the world from project to project, identifying and spreading good practices.

This is a very traditional model, but it has many major failings, and cannot be considered to be knowledge management. Imagine if you managed your finances in this way! Imagine if the only way to fund a project was to transfer a rich person onto the project team, or to fly individual millionaires around the world to inject funds into the projects they liked!

The major drawbacks of this default 'knowledge in the heads' approach are as follows:

- Experienced people can only be on one project at a time, whereas knowledge management can spread that experience to many projects.
- Knowledge cannot be transferred until people are available for transfer.
- Experts who fly in and fly out often do not gain a good appreciation of how things are done, and where the good practices lie. In particular, teams in projects may hide their failings from the company experts, in order to be seen in a good light.
- The burn-out potential for the experts is very high.
- Knowledge can become almost 'fossilised' in the heads of the experts, who can end up applying the solutions of yesterday to the problems of today
- When the expert leaves, retires, has a heart attack, or is recruited by the competition, the knowledge goes with them.

Unfortunately, for the experts and the experienced people, this can be an attractive model, and was stereotypical behaviour for specialist engineers for many years. It can be very exciting travelling the world, with everyone wanting your assistance. It is like early Hollywood movie scenes with the US Cavalry riding over the horizon to save the wagon train at the last minute. Knowledge management, however, would make sure that the wagon train did not get into trouble in the first place. As one experienced engineer said recently, 'If you could fly off to Russia and be a hero, or sit behind your desk and capture knowledge, what would you do?'.

## Partial approaches

There are many partial approaches to knowledge management, where some components of the model are applied, and others omitted. These sometimes have partial success, but nothing like the success that might be delivered by a more consistent, systematic and holistic solution. Some of the common partial solutions are listed below.

- *A technology-led approach.* Here an organisation commonly builds or buys a 'lessons learned database' where lessons can be stored, searched, and shared with other teams. Such technology can be a key component of a holistic solution, and addresses the technology components of the capture, organise and retrieve boxes of Figure 1.5. However, unless you address the people and process technologies as well, the database will either remain empty, be sporadically filled only from selected projects, or will fail to address the aspects of systematic re-use. Many organisations fall into the trap of applying a technology-led approach (possibly because it is relatively easy to buy and install a piece of technology), but find that the technology is unused. Technology is rarely the single barrier to knowledge management, and implementing technology alone is rarely sufficient. If technology were the barrier, you would see people in the organisation struggling to exchange knowledge with substandard technology such as telephones, Word documents, and paper files. It is much more common to find the barrier is lack of culture, lack of process, or lack of accountabilities.
- *A community-led approach.* A common partial approach is to implement communities of practice (see Chapter 4) as the primary knowledge management solution. Knowledge is transferred primarily in the tacit realm, along the short *connect* arrow in Figure 1.3. Sometimes the communities also take ownership of explicit knowledge, so the longer *collect* arrow is also addressed, and if this happens, then you certainly are developing a more complete knowledge management solution. However, unless the business teams and business projects are also involved in knowledge management, the 'learn before

during and after' cycle in Figure 1.6 never gets deployed, and knowledge management therefore becomes decoupled from the cycles of business activity. Many companies introduce communities of practice as the 'silver bullet' – the only thing they need to manage knowledge – while in fact communities are only one dimension of a multi-dimensional solution.

- *A document-led approach*. Here an organisation introduces document management as its approach to knowledge management. It assumes that the majority of knowledge is held in explicit form in documents, and feels that if these documents can be organised, stored, searched and retrieved (perhaps using techniques such as data mining, text summarisation and natural-language searching), then knowledge will be shared. Unfortunately, this is an extremely ineffective way of managing knowledge. Many documents contain far more data, information and knowledge, and unless there is a systematic owned process for knowledge identification and capture, then most of the knowledge will never make it into document form in the first place. In addition, unless there is a systematic owned process for knowledge validation, distillation and organisation, then knowledge will become diluted and irretrievable in a sea of irrelevant documentation. Finally, this approach deals with explicit knowledge, and will not address those components of knowledge that have to remain tacit because they are uncodifiable.

### The holistic approach

The approach to knowledge management advocated in this book is a holistic approach, which addresses all of the dimensions. The models shown in Figures 1.3–1.6 are combined into a system that addresses

- tacit knowledge (in people's heads) and explicit knowledge (in the knowledge bank);
- knowledge communication, capture, storage and retrieval;
- people, process, technology and cultural aspects;
- learning before, during and after;
- project teams and communities of practice.

The rest of this book will look at how this system can be applied to teams and projects.

## CULTURAL ISSUES

We previously discussed how knowledge management requires a profound shift in individual and corporate attitudes to knowledge. In western society, where people are educated through the western system, knowledge is seen as an individual attribute. At school, children are tested on what they know, and any attempt to access the knowledge of others is seen as cheating.[5] In professional life, people often feel a sense of pride in their own skills, knowledge and achievements, and sometimes would rather solve a problem themselves, just for the challenge, than seek for an existing solution. The individual's knowledge and experience can also be felt to be a personal asset, and a hedge against being made redundant, replaced, or outsourced.

When people feel this way, there can be many cultural barriers to knowledge management. These include the following:

- *knowledge is power:* 'if I tell you what I know, I lose some of my personal power';
- *not invented here:* 'your knowledge is not as trustworthy as mine';
- *drive to create:* 'it's more fun finding the answer for myself, than using someone else's answer';
- *fear of exposure:* 'I am not going to share my failures with you, it might make me look bad';
- *fear of exposure (2):* 'I am not going to ask for help and advice, it makes me look as if I don't know what I am doing'.

Any organisation that sees the business value in knowledge management (i.e. reducing the learning curve, bringing everyone up to the best performance standard, as discussed earlier), needs to address these cultural issues. A new culture needs to be developed, as follows

- *shared knowledge is greater power:* 'if we share what we know, we will meet our individual and strategic targets';
- *invented here is not good enough:* 'we know we don't know everything, and will look around for additional knowledge before every task';
- *drive to perform:* 'it may be more fun to create the solution, but if a better solution exists, we will use it';
- *fear of underperforming:* 'I am going to ask for help and advice, because I want to make my job as easy and safe as possible';

- *fear of underperforming (2):* 'if something went wrong on my project, I am going to make sure it never happens to any future projects';

The more a team is driven by performance (their own team performance, and also the organisational performance), and empowered to seek solutions, the more readily they will embrace knowledge management, as an aid to performance. Managers can reinforce this, by encouraging and rewarding knowledge-seeking and knowledge-sharing, by setting the expectation that every team will seek to improve on the best of past performance, by empowering teams to seek the best solutions, and by avoiding any internal competition between teams, projects and business units.

Table 1.1 The Connect and Collect approaches to Knowledge transfer

| *Approach* | *Connect* | *Collect* |
|---|---|---|
| Advantages | Very effective<br>Allows transfer of non-codifiable knowledge<br>Allows socialisation<br>Allows the knowledge user to gauge how much they trust the supplier<br>Easy and cheap | Allows systematic capture<br>Creates a secure store for knowledge<br>Very efficient: Knowledge can be captured once and accessed many times |
| Disadvantages | Risky: Human memory is an unreliable knowledge store<br>Inefficient: People can only be in one place at one time<br>People often don't realise what they know until its captured | Some knowledge cannot be effectively captured and codified<br>Capturing requires skill and resource<br>Captured knowledge can become impersonal |
| Types of knowledge suitable for this form of transfer | Ephemeral rapidly changing knowledge, which would be out of date as soon as its written<br>Knowledge of continual operations, where there is a large constant community<br>Knowledge needed only by a few | Stable mature knowledge<br>Knowledge of intermittent or rare events<br>High-value knowledge<br>Knowledge with a large user-base<br>A strategy based only on capture will miss out on the socialisation that is needed for culture change, and may fail to address some of the less codifiable knowledge |
| Comments | One traditional approach to knowledge management is to leave knowledge in the heads of experts. This is a risky and inefficient strategy | |

**Figure 1.1** The data – information – knowledge – action link

**Figure 1.2** The varying codifiability of knowledge. Some tasks (such as cooking, or constructing a garden shed) are relatively simple and easily codifiable. Others may be quite simple (riding a bike), but very hard to codify.

**Figure 1.3** The flow of knowledge from supplier to user

**Figure 1.4** Enabling aspects for knowledge management

**Figure 1.5** Knoco Ltd 12-component framework for a knowledge management system

**Figure 1.6** The learning before, during and after model

**Figure 1.7** Three types of knowledge transfer

**Figure 1.8** The knowledge/performance loop.

**Figure 1.9** Knowledge management and the learning curve

**Figure 1.10** Knowledge management and performance benchmarking.

**Figure 1.11** Categorisation of types of knowledge. The horizontal axis measures the level of in-house knowledge – i.e. how much do you already know about this topic? The vertical axis measures how important the knowledge is to your business – i.e. how much do you need to know?

## NOTES

1 'Heuristics' refers to the rules of thumb, guidelines, working models, and educated guesses which people use to solve problems.

2 One exception is the exchange of knowledge through e-mail dialogue in a shared e-mail forum. Here knowledge can be exchanged between a small number of individuals, but that e-mail exchange can be observed by others, and stored for future reference. More detail of online e-mail forums can be found in Chapter 4.

3 This statement should not be taken as meaning that only people with defined roles should be involved in knowledge management. On the contrary, everyone in the organisation will be involved in knowledge management and learning, but specific assurance roles are needed to make sure the knowledge management systems are applied and followed. The analogy is with safety – everyone in the organisation needs to work in a safe manner, but the accountability for the safety system lies with defined HSSE roles. The absence of these accountabilities is one of the most common reasons for failure of a knowledge management system.

4 There is no point in trying to manage all your knowledge. For much low-value knowledge, the cost of managing it outweighs the value that management will generate. You need to focus on those knowledge areas where the value far outweighs the management cost.

5 There is more of a trend towards course work and group work in western schools today, which may lessen some of the cultural barriers to knowledge sharing in future generations.