

Demystifying Knowledge Management

A Best Practice Guide for the Construction Industry



Constructing Excellence is driving forward productivity improvements in the UK construction industry through a set of integrated programmes focused on delivering process, product and cultural changes.

The key objectives of Constructing Excellence are to improve performance through increased productivity and competitiveness; to improve the industry's image by changing its culture, developing its people and engaging better with communities and customers; and to engage and take action with individuals, businesses, organisations and industry associations.

This guide demonstrates how knowledge management can be an important tool in achieving Constructing Excellence objectives. It takes a step-by-step approach to starting a formal knowledge management programme, concluding with an explanation of why the 'knowledge management journey' is important and the value of the benefits it yields.

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Introduction



Construction is a knowledge-based industry. Even small construction projects need ideas, knowledge and experience from many sources – including people, printed documents and electronic media. Construction firms have been managing knowledge informally for years but the challenges facing today's industry mean that most organisations now need a more structured, coherent approach to knowledge management.

This guide suggests ways in which construction firms can improve their knowledge management. It has been written for people in organisations that are just getting started in formal knowledge management and includes guidance that can be applied to whole organisations, parts of organisations and projects. Actions that will improve knowledge management are suggested throughout the guide, together with illustrative case studies.

The guide explains why knowledge management is important and describes how and when to:

- create new knowledge
- find existing knowledge
- use knowledge
- share knowledge
- organise and store knowledge.

A matrix is given on page 8 to show the common knowledge management tools and techniques that can be applied to these activities. Good practice guidance on each activity is given on pages 9 to 15.

A knowledge management maturity scale is included on pages 16 and 17. The scale helps organisations understand where they are in terms of knowledge management and describes practical steps for making knowledge management more effective.



What is knowledge management?

Knowledge management (KM) is the way in which organisations create, find, use, share and organise knowledge. The purpose of KM is to improve performance by making sure people can access and apply the right knowledge, at the right time and the right place.

Knowledge can exist in documents and databases (where it is known as explicit, or codified, knowledge) and in peoples' minds. The knowledge in peoples' minds can be things they don't realise they know, including know-how and intuition. This hidden knowledge is known as tacit knowledge.

KM isn't new — construction firms have been managing explicit knowledge for years through manuals, databases, best practice guides, standards and procedures. Tacit knowledge is more difficult to manage and often surfaces only through interaction between people at meetings and informal events. A good example of a traditional route to sharing tacit knowledge is the master-apprentice relationship.

Today's construction industry is more challenging than ever before. Clients are becoming more demanding, many firms operate internationally and decisions have to be made quickly – yet still have to take account of past experience and recent innovations and include new ideas.

These challenges mean that organisations need to develop a more structured, coherent approach to KM. This is recognised by many construction clients, who are increasingly asking for evidence of KM from the firms that work for them.

The biggest barrier to KM in most construction organisations is culture. Many experienced construction professionals see knowledge as power and are reluctant to share it. People are also reluctant to learn from others' experience — 'not invented here'. If these problems are not solved, firms risk losing knowledge as experienced individuals retire without passing on what they know.

Successful KM results from:

- choosing KM activities that contribute to the organisation's overall business goals
- creating a culture in which people are willing to share their own knowledge and experiences and to learn from others
- having processes that make knowledge sharing an everyday activity
- the use of IT to make it easy to access knowledge and knowledgeable people.

Benefits of KM

- fewer repeated mistakes
- less duplication of work and less waste
- lower dependence on key individuals
- faster access to relevant information
- faster, better problem solving
- more effective teamwork
- more innovation and better ideas
- higher client satisfaction
- improvements in employees' motivation and personal satisfaction.

Getting started in KM



Building the case for KM

Most organisations getting started in KM will require some kind of justification for investing in KM activities, even if the investment is just staff time. A successful business case:

- clearly links KM activities to the achievement of business goals
- describes the expected benefits of KM in terms that will appeal to corporate decision-makers
- includes appropriate metrics so that the value of KM activities can be monitored.

KM is not an end in itself, it is a means of achieving organisational goals or solving problems. The starting point is therefore to be clear about what the organisation wants to achieve.

For most construction firms, the first challenge is not to start managing knowledge – but to realise that we have all been managing knowledge informally for years and can build on existing good practice. The key questions are then:

- 1 What are the organisation's current and future knowledge needs?
- 2 How well is knowledge managed at present?
- 3 How do current KM activities affect the organisation's ability to meet its goals and solve its problems?
- 4 How could KM contribute more to the organisation's goals?
- 5 What actions are needed?

Most of these questions can be answered by gathering information from people in different groups and project teams – through questionnaire surveys, interviews, meetings or a combination of these techniques. It is important to make it clear that knowledge is more than information – people need access to know-how and experts, not just to documents and databases.

Client drivers for KM

The justification for KM can come from clients.

BAA asks its framework suppliers for **demonstrable evidence** of KM in the form of case studies. Suppliers are asked to describe work for other clients, set out the benefits to the client and supplier in terms of knowledge shared and comment on successes and complications. BAA then contacts the clients for confirmation that the case studies are accurate representations.

Once the current KM position has been established, it will be clear how people in the organisation access information, how knowledge is transferred from one project to another, and how knowledge is shared between people. Opportunities for improving KM will also start to emerge at this stage – there might be good practices in one part of the organisation that can be transferred to others or obvious gaps where people consistently have difficulty finding the information or expert advice they need.

The next step is to develop a plan for improving KM to help the organisation achieve its goals and solve its problems. In practice this means working out how and when to **create** new knowledge, **find** existing knowledge and **use** knowledge. To support these activities, it is also necessary to consider how best to **share** knowledge and to **organise** and **store** knowledge. A range of tools and techniques is available for each of these activities. The activities, tools and techniques are summarised on page 8 and described on pages 9 to 15. Different organisations need to adopt different mixtures of tools and techniques, depending on the nature of their work, what they are trying to achieve and their culture and style of operation.

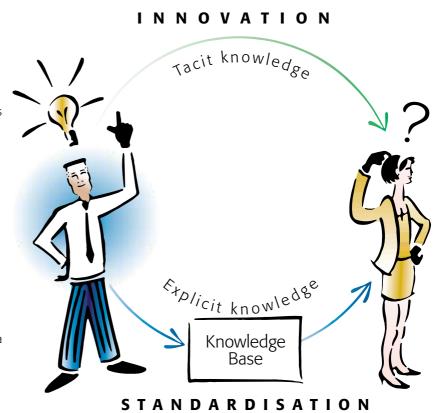
One of the key decisions is whether to focus on connecting people with information (in documents and databases) or connecting people with other people to encourage the sharing of tacit knowledge and the generation of new ideas. Firms that carry out a lot of routine, standard work generally need to focus on connecting people with information; whereas firms

Arup

Arup recognises two types of work that need different approaches to KM. Innovative work is supported by promoting dialogue and debate to exchange tacit knowledge, using tools and techniques including an electronic people finder (see page 11) and communities of practice (page 14).

More routine, standard work is supported by an explicit knowledge base of project and market reports, internal and external databases.

that work on one-off innovative projects generally need to focus on connecting people with people. Most construction firms will need a blend of the two approaches, supplementing access to standard documents and procedures with access to the knowledge of the best people and networks.



KM tools and techniques

Various tools and techniques can be used to create, find, use, share, organise and store knowledge. Pages 9 to 15 describe these activities and some of the most widely used KM tools and techniques that can be applied to make them more effective.

The tools and techniques are summarised in the matrix below and the activities to which each can be applied are indicated by shaded cells. Most of the tools and techniques can be applied to more than one activity so the matrix also indicates the page on which the tool or technique is described.

	Creating knowledge	Finding knowledge	Using knowledge	Sharing knowledge	Organising and storing knowledge
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Creating knowledge

All construction firms have to innovate and therefore create new knowledge. For organisations whose business depends on innovation the challenge is to find ways of generating new ideas, then to develop these ideas into workable solutions to construction problems. For organisations whose projects are more standard and repeatable, there is a constant challenge to seek out opportunities for improving standard processes and reducing waste.

Knowledge is created by applying tacit knowledge to construction problems. Because tacit knowledge exists in peoples' minds, the tools and techniques that support knowledge creation are ways of managing people and the way in which they interact.

The need to create new knowledge does not mean existing knowledge should be ignored. One of the main arguments for KM is to eliminate waste caused by repeated reinvention of the wheel.

Key questions:

- What is the problem that needs to be solved?
- Who are the people with the right knowledge and attitude to help solve this problem?
- What other knowledge, from different disciplines, might help solve this problem?
- How can we bring the right people together in a way that will produce a solution to the problem?

Creative problem solving

There are various techniques for encouraging creative thinking and the generation of innovative ideas by groups. One of the best known is brainstorming, where people shout out as many ideas as possible to solve a problem. To encourage people to contribute freely, members of the group are not allowed to criticise ideas until the brainstorming session has finished.

Creative problem solving sessions work best when the group has an experienced facilitator, particularly when people are being encouraged to 'think outside the box'. The facilitator provides support and encouragement and makes sure the group focuses on the problem.

Organisational slack

Time and space for thinking is essential for creating new knowledge. Creativity will not thrive unless people have time to reflect, challenge established thinking and work out solutions to problems. For construction firms this can mean building non-chargeable time into peoples' work schedules, allowing people to experiment with different solutions to a problem or making sure that people with specialist knowledge are not fully committed to projects – so they have time to help out as problems arise.

Organisational slack at the project level led to construction time savings on the Stanstead 'trees' – the structures that support the roof inside the airport. BAA allowed its contractors to experiment with assembling the 'trees' off-site, which reduced construction time by more than six weeks.

Finding knowledge

Two of the main benefits of KM are that it stops people repeating mistakes already made by others and reduces duplication of work. Stopping people from repeating mistakes is important not only to reduce waste, but also to meet legal and insurance obligations. To realise these benefits, people have to be able to find the knowledge they need.

Explicit knowledge is often captured in manuals, technical notes, databases and best practice guides. It can also be held in organisational processes and procedures. Most organisations use an intranet with a search engine (see page 15) to help people find this sort of explicit knowledge.

The most valuable knowledge is often not captured in documents, either because no-one has written it down or because it is tacit knowledge that can't be written down. Access to this knowledge is through other people – colleagues in the same office, mentors, and experts inside or outside the organisation.

Internal sources of help might include technical helplines and departments. The traditional way of finding the right expert is to use

personal networks. External sources of help include other firms, universities, trade associations and research bodies. More recently,

Networking

Networking – internal or external – is a good way of accessing the knowledge of other people and organisations and getting to know experts.

External networking opportunities include:

- conferences and seminars
- training events
- meetings and workshops

- inter-company visits
- membership of external organisations
- web and email discussion groups.

It can be difficult to find time for networking when events such as conferences compete with projects for peoples' time. But networking is a valuable knowledge sharing activity and networking time should be built into schedules. construction organisations have started to create electronic people finders to make it easier and faster to identify knowledgeable individuals.

Project reviews

In construction, finding knowledge is rarely just about reusing a document or asking a colleague a simple question. Knowledge usually has to be customised to meet the needs of a particular project.

Project reviews are a valuable mechanism for bringing people and their knowledge together so that discussion can be structured around specific project issues. In this way, valuable knowledge from reviewers can be unearthed.

Reviews can take place before, during or after a project. Pre-project reviews are used to gather

knowledge and insights from people with relevant experience – good and bad – from other projects. Post-project reviews are a means of capturing learning at the end of a project so that it can be made available to other projects. Reviews that take place during a project can be to gather knowledge to solve a particular problem or to capture learning from something that has gone particularly well or particularly badly.

Project reviews are usually structured meetings at which discussion is based round questions such as:

- what went well (and why)?
- what could have gone better (and how?)

Some reviews, particularly post-project reviews, benefit from independent facilitation.

People finders

Electronic people finders (sometimes called corporate yellow pages) are searchable databases of individuals and their skills, with other information such as the individual's job title, location and contact details. They are used for finding people with specialist knowledge within an organisation. People finders are usually part of an organisation's intranet.

There are different ways of populating people finders. Some organisations encourage individuals to contribute their own details without checking accuracy, whilst others validate information about skills before it is accepted. The approach depends on the organisational culture. Some people finders include personal interests and skills, whereas in other organisations this would be unacceptable.

Arup people

At Arup, individuals are invited to declare their skills, share documents and offer a photo in response to a series of questions. This free and easy approach has helped the firm to improve access to experts and improve responsiveness to client questions.



Using knowledge

Knowledge has no value unless it is consistently used in the right way, at the right place and at the right time. Yet constraints on peoples' time mean they often use the knowledge most readily to hand rather than the knowledge best suited to each situation.

To encourage people to use the right knowledge, it must be easy to find and use. But this is rarely enough. In most organisations the challenge is not a shortage of readily accessible knowledge; it is reluctance on the part of individuals to use it. This can be because of:

- lack of awareness of the need to seek out existing knowledge
- perceived lack of time to find knowledge before making a decision
- difficulties in finding and understanding knowledge in the organisation
- a preference to repeat previous work rather than look at how others have tackled problems

 a desire to innovate without looking to see whether the problem has already been solved by someone else

These are as much about individual behaviour and organisational culture as they are about KM and have to be addressed using rewards and incentives.

KM, behaviour, and organisational culture

Successful KM requires an organisational culture in which people are willing to share their own knowledge and experiences and to learn from others.

Organisational culture and individual behaviour are closely linked. People are usually willing to share and reuse knowledge but they need a supportive, safe environment in which to do it. Most construction firms don't provide this – they tend to be competitive places in which people are blamed when they make mistakes, and rewarded for individual effort rather than helping others.

Creating the right culture for KM is a major long-term challenge for most construction firms.



- start by encouraging individuals to share and reuse knowledge – offer rewards and recognition for knowledge sharing
- find out why people don't share and re-use knowledge and eliminate barriers
- make it clear that knowledge sharing is important
 put it in job descriptions and appraisals
- work within the organisational culture to change it.



Sharing knowledge

To ensure that knowledge is available to be re-used in an organisation, individuals and project teams have to share what they know with others. Knowledge can be shared through some kind of knowledge base or through more direct exchanges between people:

- key documents can be shared through an intranet (see page 15) so that others can use them
- best practices can be shared through organisational processes and standard procedures
- lessons learned through project reviews can be distilled into documents or databases and shared through an intranet
- people can share their knowledge by telling stories about their experiences
- knowledge can be shared through mentoring and coaching
- people can participate in communities of practice to share tacit knowledge and develop explicit knowledge that can be used by the whole organisation.

People are far more likely to share knowledge if they get something in return. This can be recognition that contributes to their professional reputation – being named as the author of a best practice guide, for example - promotion, or more interesting work to do.

To share explicit knowledge, people have to trust that it will be re-used in the right context and with appropriate sensitivity. Organisations can learn a lot from peoples' mistakes, for example, but individuals will only be comfortable sharing such knowledge if there is a genuine no-blame culture.

Sharing of tacit knowledge also requires trust and will usually take place only when the knowledge sharer has built up a rapport with the recipient. Tacit knowledge sharing can be encouraged by creating



opportunities for people to interact informally and build strong relationships.

Organisations that want people to share their tacit knowledge have to understand the value of the sharers' contribution and give experts time to help other people. An active knowledge sharer might be helping to solve problems on many projects at a time, but might not be seen as billable on all these projects. Separate budgets should be created for experts so they are available to give advice when it is needed.

Storytelling

Traditional ways of sharing knowledge can be rather formal and uninspiring. Storytelling is a way of making knowledge sharing more engaging and interesting. It is a good way of sharing tacit knowledge, because people tell stories with feeling and context.

Stories can be used to inspire change, capture tacit knowledge and build community spirit as well as to communicate experiences and ideas.

The most effective stories are:

- true and recent
- delivered orally rather than in writing
- positive, with a happy ending
- told from the perspective of a single character the audience can identify with.

Sharing knowledge

Workplace design

Good workplace design can encourage people to create, share and use knowledge to the benefit of the organisation.

There is no 'right' way to design a workspace – it will depend on how the organisation wants people to work and interact to achieve business goals.

Knowledge sharing can be enhanced by providing cafes and breakout areas where people can meet informally and project team areas so that people working together can sit together. Touchdown areas can be created to make it easy for people based in other offices to visit different locations.

Good workplace design can improve organisational culture, reduce stress, increase productivity and improve motivation and morale.

Communities of practice

Communities of practice (CoPs) are networks of people with a common interest who deepen their knowledge by interacting on an ongoing basis. Many construction firms encourage and support CoPs because they are a valuable mechanism for developing, sharing and managing specialist knowledge across organisational and geographic boundaries.

CoPs vary in the way they are created, organised and managed. They can be designed or emergent, multidisciplinary or based round a single functional role or skill and small local groups that meet face-to-face or global communities that communicate by email.

Many of the most successful CoPs are informal groups with voluntary membership, started by people with common aims or roles. Members share knowledge because they have strong relationships with each other and want to help the wider community.

To nurture CoPs, organisations can:

- encourage people to create and join communities that will enhance the organisation's capabilities
- encourage existing communities to set objectives and create roles such as facilitator and knowledge editor
- provide infrastructure such as space on the company intranet to help community members interact with each other and the rest of the organisation.

Mentoring

Mentoring is widely used to spread the skills and knowledge of experienced people to others in the organisation.

Mentoring can be a formal arrangement, such as an apprenticeship, or an informal arrangement in which an experienced person provides general support and advice to one or more less experienced individuals.

One of the biggest benefits of mentoring is that knowledge is retained and spread in an organisation – it doesn't walk out of the door when people leave.



Organising and storing knowledge

Explicit knowledge has to be organised and stored so that it is accessible and understandable to people who want to access it. In the project environment, extranets are often used to make sure project team members have access to up-to-date documents and information. Across organisations, intranets are accepted as the best way to give people access to knowledge.

Intranets and search engines

Intranets are widely used as the single point of access to an organisation's knowledge. An intranet can give people easy access to information stored in documents; people finders and other databases; and other systems such as design and accounting packages. In some cases, individual access is by logins and passwords so that staff access information appropriate to their role and sensitive information from financial and human resources systems is protected.

The intranet and the databases and systems behind it have to be structured in a way that is transparent to users but that makes it easy to retrieve the right knowledge. There are many different ways of organising information and many technology systems that support information storage and retrieval. The appropriate solution for an organisation is the one that most closely supports the organisation's culture and way of doing business. Some organisations adopt a rigid document structure that users search by author, title, date and keywords. Others adopt a less formal approach where a search engine cuts across content in multiple documents and databases.

Taylor Woodrow

At Taylor Woodrow, the KM focus is on establishing a knowledge sharing culture and making sure each part of the business knows what other parts know. Knowledge is gathered from site, helpline enquiries, project close-out reports and supply chain partners, then shared with the whole business through the company intranet, Tayweb. The intranet gives people access to a range of information and services including a technical helpdesk, 'top tips' and a monthly newsletter, Technical Service News. It also provides links to external knowledge sources such as British Standards and Building Regulations.

Intranets need careful content management procedures to make sure information is reliable and up to date. It is also important to recognise that intranets can only provide access to explicit

knowledge. If tacit knowledge is important

to an organisation, the aim of the intranet should be to encourage and facilitate interaction between people rather than to give definitive answers.



The KM journey

Organisations that want to improve the way they manage knowledge are setting out on a journey. Good KM can help organisations become more effective, more profitable and better places to work – but the KM journey should not be undertaken lightly. It requires commitment, development of a knowledge-sharing culture and a drive for continuous improvement.

To help organisations understand where they are on the KM journey, Henley Management College has developed a KM maturity scale. Based on the Knowledge Journey model developed by KPMG Consulting, the maturity scale highlights areas for improvement and helps organisations decide where to focus efforts in developing their approach to KM.

The following descriptions are designed to help organisations determine their current position on the scale. About 75% of construction organisations are knowledge chaotic, aware or enabled — only 10% are knowledge centric. The guidance on the page opposite is designed to help the target audience for this Guide — those close to the start of the KM journey. More advanced guidance is given in the KM in Construction Toolkit (see Practical next steps at the end of this Guide).

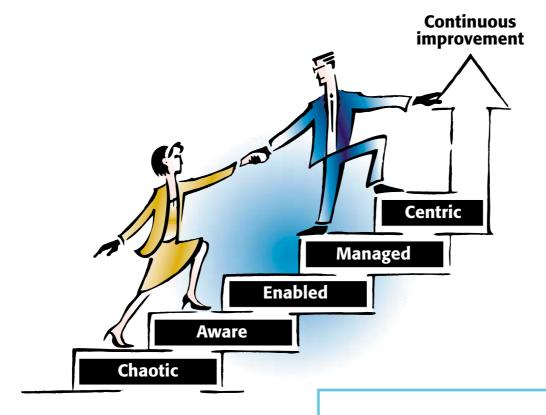
Knowledge chaotic – the organisation doesn't have many processes and systems for sharing knowledge and people are reluctant to share what they know.

Knowledge aware – the organisation understands the importance of managing knowledge and has started to identify how knowledge is used and shared, but awareness and understanding of the issues vary across the firm.

Knowledge enabled – KM is beginning to benefit your company: procedures and tools are available, but there are still some problems.

Knowledge managed – The framework and tools for KM are well established, technical and cultural problems have been solved and there is a KM strategy in place which is updated regularly.

Knowledge centric – KM is central to the company mission and its value is measured and reported on.



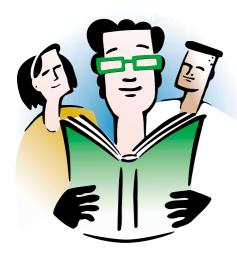
Practical steps for moving from chaotic to aware

- Gather information from within and outside the organisation to understand how knowledge is currently managed.
- Work out how KM could contribute more to the organisation's goals.
- Identify champions for KM in key areas and develop a task force to look at how KM can support the organisation's strategy.
- Identify functions and groups who will benefit from KM and engage them in your activities to start to build commitment.
- Identify initiatives already underway that have a KM element and work out how to interface with them. Relevant initiatives might include intranet development, changes to performance appraisal systems, or culture change programmes.

Practical steps for moving from aware to enabled

- Choose appropriate tools and techniques to support KM activities and contribute to business goals.
- Identify the people, processes and technology required to implement these tools and techniques and secure the necessary resources.
- Build on existing KM successes and pilot new tools and techniques in parts of the organisation or on projects.
- Continue to build commitment to KM by identifying specific benefits and sharing success stories from within and outside the organisation.
- Monitor KM activities to identify barriers to success and opportunities for improvement.

Further reading



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Practical next steps

Contact the authors of this Guide.

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