



A Framework for Practising Knowledge Management

Colin Armistead and Magda Meakins

The management of an intangible asset such as knowledge is beset with complex and theoretical concepts. This paper sets out a matrix that describes four approaches to Knowledge Management based on whether it is in an organisational or an individual context, and whether knowledge management is imposed or empowered by managerial approaches. It explores the validity of the framework through an analysis of ongoing management projects at seven organisations. © 2002 Elsevier Science Ltd. All rights reserved.

Introduction

Over the last 50 years there has been a growing recognition of the role of knowledge in effective organisations. The concept of the post-industrial society embodies the rise of service-based economies dependent on knowledge, the place of knowledge and knowledge workers.¹ In many industrial sectors physical assets become less important. The intangibility associated with knowledge in services is portrayed as *living on thin air* or the *weightless economy*.² In the US, the weight of the economy's total output has not changed significantly in the last 100 years despite a twenty-fold increase in the GDP.³ The technological innovation of the Internet and the worldwide web have expanded the debate of the nature of organisations and the way people work. Knowledge Management (KM) is the notion that seeks to represent how organisations create, use and protect knowledge.⁴

Strategists describe the inclusion of knowledge as a primary asset as the extension of the resource-based view of the firm to one that is specifically knowledge based.⁵ The value of knowledge results from the way in which it is used in the firm's processes in the production of products and services.⁶ A firm can gain advantage from using the capabilities that arise from knowledge

Colin Armistead is Professor of Operations Strategy and Management in the Business School at Bournemouth University. He is Head of the Strategic Management Group, Head of Research and Head of the Centre for Organisational Effectiveness (COE). Colin's interests are in organisational performance improvement from a strategic and operational perspective. His current work encompasses three main areas in the context of e-business; knowledge and learning in organisations; e-service and the impact on customer service; performance management in the context of business process management.

Magda Meakin's career developed into educational

assets in ways which are difficult for others to imitate or replicate, as well as the intellectual property associated with the assets.⁷ However the ability of firms to measure the value of intangible assets including knowledge still remains problematic despite serious efforts to produce generic frameworks.⁸

Despite this limitation, there are prescriptions for improving managerial practice. These rest on a mix of pragmatic advice about managing knowledge and intellectually challenging concepts concerning the nature of knowledge.⁹ There are, perhaps, three over-arching aspects of knowledge that managers need to consider in the performance of KM programmes:

1. The identification and roles of explicit and tacit knowledge

Discussions of KM begin by addressing the question, “What is knowledge?” The most popular tenet here rests on the forms of knowledge that can be expressed for codification. The “robust” assumption is that tacit knowledge is difficult to extract from the human mind, thus limiting the manipulation and transfer of this type of knowledge.¹⁰ Accordingly, explicit knowledge has become associated with information (and information systems), and tacit knowledge linked to models and behaviours that are considered to aid its expression and transfer.

2. Collective (social) aspects of knowledge

management and then management training following initial training as a musician and teacher. Since 1990, Magda has been a Senior Manager with the Post Office (now Consignia) working to support management initiatives such as Total Quality, Business Process Improvement, Business Excellence and, currently, a Balanced Scorecard approach. Between January 1999 and April 2000, Magda was on full-time secondment to The Business School, Bournemouth University as a Research Analyst working on Knowledge Management.

The notion that knowledge can reside at the collective level has received considerable attention, not least because it has introduced debates about informal networks or “communities of practice”.¹¹ One of the key issues here is the role of social interaction in the access to this type of knowledge. The concept has also been important in emphasising processes in the using, integrating, transferring and sharing of knowledge. Communities (and collective knowledge) are rarely discrete so an organisation can be considered to represent overlapping communities within and, of course, between organisations.¹²

3. The context for knowledge

Mere acknowledgement of aspects of tacit knowledge and collective knowledge are not sufficient for effective KM programmes; the manager will need to

develop the appropriate context for the formation of new knowledge and the encouragement of collective (social) knowledge.¹³ This has been recently discussed in the descriptive (rather than empirical) concept of “ba”.¹⁴

Approaches to knowledge management

Faced with the challenges of both understanding the nature of organisational knowledge and the way it is managed, we might expect managers to seek pragmatic approaches. They will aim to improve organisational effectiveness through KM by these means, even though they might over simplify some complex concepts in the process.

We know that there are differences between organisations in their perspectives of knowledge. Venzin and co-workers¹⁵ make two important distinctions. According to the cognitive perspective of knowledge, new knowledge is created when historical knowledge is redefined through new ‘incoming’ insights (data, information or knowledge). A connectionist perspective suggests knowledge can be created during the identification of novel relationships and networks. This may be in looser social or more rigid technical networks.

These discussions resonate with the managerial paradox of improving performance through tight or loose control systems aiming for organisational effectiveness.¹⁶ We can interpret this notion further as one of *imposition* or *empowerment*. Imposition is associated with bureaucracy, structured systems and attempts to codify all aspects of knowledge. We might expect such perspectives to be more inclined to explicit rather than tacit knowledge. In contrast, empowerment will recognise the potential in the social and individual for knowledge creation and sharing, in which the tacit as much as the explicit aspect of knowledge is engaged.

We consider that managers are likely to be concerned with

	Imposed	Empowered
Organisational	Prescribed	Adaptive
Individual	Compliance	Self-determination

Figure 1. Framework for knowledge approaches

knowledge at an individual and organisation level and with particular approaches to managing knowledge. Consequently we propose a managerial framework which uses the constructs of imposed and empowered as one axis and the individual and the organisation as the other.

Prescribed suggests a formal approach to knowledge and KM at an organisational level. We might see technology deployed widely to capture, store and protect knowledge.

Compliance requires individuals to engage in knowledge activities through contract and regulation. Resources are allocated through formal performance management processes.

Adaptive engages with the informal within the social fabric of the organisation in the sense of communities of practice and the self-management of teams.

Self-determination encourages individuals to take responsibility for their contribution to learning in the knowledge creation and sharing processes.

Investigating Knowledge Management programmes in practice

A number of companies have actively engaged in knowledge activities with some success. We have investigated some of these companies. We were keen to understand how managers had interpreted some of the abstract issues in KM (such as “tacit” knowledge), which tools and methods had appeared effective, which stumbling blocks existed. We were also keen to scrutinise the findings to explore the application of our matrix.

We selected seven organisations in different industrial sectors, each with ongoing KM programmes, and gained permission to undertake interviews with managers concerned with these activities. The companies were: BP Amoco, BT, Jaguar, Management Consultancy, Nortel Networks, RM Consulting and Quidnunc. The companies, the position of the interviewees, and a résumé of the KM programmes are presented in Table 1.

The interviews lasted for approximately two hours and used a semi-structured framework that sought to understand the issues noted above. The interviews were taped and transcribed for a two-stage analysis. First, the interviews were coded to elicit themes from the data which gave answers to our questions on why managers engage with knowledge and which approaches they take. The themes were then interpreted to give a greater understanding of knowledge approaches in the quadrants in the matrix. Through this process a number of features were associated with each quadrant.

Why managers engage with knowledge?

We found managers were engaged with thinking about knowledge and KM for a variety of reasons. Not least KM was seen

Table 1. Participant organisations background and scope of knowledge projects

Organisation and Interviewee	Background	Context and scope of KM strategy
<p>RM Consulting</p> <p>4 Project Managers, including the “KM Core Process Leader”</p>	<p>Internal consultancy in a leading distribution company to oversee project management and “expert service provision”. Structured as 20 practitioner groups based on skill sets, totalling about 1,000 staff.</p>	<p>KM has been formally implanted through a “knowledge process forum” that interacts with the consultancy practitioner groups. KM initiated after a cultural review that indicated poor expression and sharing of knowledge and expertise. Based on technological approaches (intranet) and cultural development.</p>
<p>British Telecom</p>	<p>Telecommunications service with UK and world-wide ventures managed by 125,000 staff. A process driven organisation that has sought opportunities to improve cost structures.</p>	<p>KM started as an efficient strategy to move documents on the company intranet. Later extended by some, but not all functions, as a cultural initiative to increase sharing and expertise across the organisation. The functions involved include “corporate clients”, “human resources” and “research and development”.</p>
<p>Managers (2) responsible for “Global KM” and “Domestic KM” respectively</p> <p>Jaguar</p>	<p>Engineering design unit for luxury car manufacturer.</p>	<p>Currently experimenting with technologically based approaches to the capture and sharing of knowledge. This initiative is centred on the development and use of a “Knowledge Based Engineering” system that seeks to capture and use knowledge about generic product designs for the development of new designs.</p>
<p>Manager responsible for “Knowledge-Based Engineering”</p> <p>Quidnunc</p>	<p>Software company of 150 staff based in UK, USA, India.</p>	<p>Has adopted KM as a company-wide strategy to manage the culture for induction (learning), knowledge sharing and error avoidance. As a fast growing company, a strong induction strategy was regarded as essential. Nature of project work requires leading edge knowledge. KM strategy encompasses both technological tools (intranet) and cultural development.</p>
<p>“Principal” responsible for “internal KM activities”</p> <p>Management Consultancy</p>	<p>A famous internal consultancy of 60,000 employees that provides auditing, corporate financing and advisory roles.</p>	<p>KM is based around a “Global Knowledge Council” of 25 people who direct and manage knowledge strategies in world-wide divisions. KM has developed from a “Global Best Practices” strategy, and emphasises the importance of sharing knowledge. Knowledge strategy achieved by technological tools as well as cultural approaches and the identification of “knowledge specialists”.</p>

Table 1. Continued

Organisation and Interviewee	Background	Context and scope of KM strategy
<p>“Partner” in the Audit and Business Advisory Practice, responsible for “UK knowledge agenda” Nortel Networks</p>	<p>A global technology company that provides networks for telecommunications and internet protocols. A dynamic organisation that undergoes significant re-organisation on a 8–10 month basis.</p>	<p>KM developed from expansion of the intranet, and has recently extended to an awareness and strong support of informal network structures. Knowledge strategy is supported by the “Priorities Process” which supports informal discourse, and “Talent Management” which increases awareness of company expertise.</p>
<p>Vice President of Global Professional Services Division BP Amoco</p>	<p>A global oil and gas extraction organisation.</p>	<p>A “pioneer” in KM programmes, BP Amoco first deployed video-conference facilities to increase the sharing of expertise between geographically disparate extraction projects. The knowledge initiative has progressed to a cultural attitude that encourages sharing and effective contingent knowledge, and argues that performance and knowledge activities are tightly linked.</p>
<p>Global Knowledge Management Officer</p>		

as being related to other ideas about learning in organisations. However, here there is often some degree of confusion about the definition of KM:

“...And whether knowledge management is part of a learning organisation or whether a learning organisation supports knowledge management as well (RM Consulting).”

This organisation had explored approaches to the “learning organisation”,¹⁷ which regards learning as a systems-level phenomenon that is embedded in the organisation, but could not make a clear distinction between this and the broader context of KM. Other research suggests that because KM and notions of organisational learning have separate histories¹⁸ they have rarely been integrated in organisations: this may be the case for RM Consulting. However there are obvious dangers if managers and employees lack a shared understanding of the relative positions of interrelated concepts and approaches.

All of the managers expressed the belief that knowledge activities were vital to their success. In some cases, represented by

the Management Consultancy, Nortel Networks and Quidnuc, managers expressed something of a visionary belief that knowledge could transform the organisation. For example, in the Management Consultancy:

“An implicit vision, that we had this knowledge, that if you could put it in one place, it would just be enormously powerful.”

This belief in the potency of knowledge was perhaps strongest in this group who perceived themselves to be knowledge “intensive”, and fully recognised knowledge as an asset:

“By definition, the knowledge within our organisation is the only thing we have. It is the very DNA of a professional services organisation (Management Consultancy).”

Organisations such as large professional service providers clearly need to capture, organise and share knowledge to perform. They also need to generate new forms of knowledge if they are to survive in the longer term. In these organisations approaches to knowledge were very closely integrated into their strategies, and their ability to manage knowledge was regarded as a core capability.

“We believe it’s all about (the) integration of people, process, technology, but strategy and structure as well (RM Consulting).”

All the managers perceived that improved organisation of knowledge would lead to improved organisational effectiveness. They assumed that this would be a consequence of increased knowledge sharing and, accordingly, the managers perceived this to be an important role for KM. Some respondents, including the Management Consultancy, BT and BP Amoco, perceived benefits at an operational level through improvement in the efficiency of work and cutting costs. This is evident in the origins of KM activities in British Telecom, an organisation that has large volumes of information for sharing:

“Knowledge Management as an idea started off as a good way of getting documents across the country.”

Quidnunc emphasised that KM was regarded as a means to cope with the rapid growth of the company. For example, this necessitated the employment of graduates who lacked practical experience and needed knowledge and expertise from senior people to contribute to the organisation:

“We have a lot of new people (graduates)...and we’ve obviously got to get the knowledge trickling down to them as quickly as possible.”

This was an important aspect of KM in Quidnunc, in addition to the application of KM activities to reduce errors in work processes and thus improve quality directly:

“It’s okay to make a mistake once, but you shouldn’t make it twice...to stop that happening you need to pass on lessons learnt, not you but the whole organisation.”

Perhaps not surprisingly we found that in organisations where managers perceived knowledge to be at the core of their business, there was a tendency for KM to be perceived as a way to integrate the business processes. In other organisations the adoption and approaches to knowledge and KM appeared to be more discrete, being held within one function or process. We perhaps can characterise organisations into two broad groups. Those including the Management Consultancy who have a visionary approach to knowledge and for whom KM is at the heart of their strategy, and those such as Jaguar for whom KM is seen as a route to operational performance improvement.

A question of approaches to knowledge

While there were similarities and differences in the reasons for addressing issues of knowledge and KM in the organisations, our interest was also in understanding what attitudes the managers were exhibiting to the way KM should be approached. Here we have used the theoretical matrix shown in Figure 1 which presents four quadrants on the dimensions of the individual and the organisation and the tendency to impose or empower approaches to knowledge. Would we find that some organisations showed a greater tendency in one quadrant or another, or might they be present in more than one depending on particular circumstances? We identified features that we interpreted as fitting within each of the matrix quadrants from the themes in the interview and supporting data. Each of the four quadrants of the matrix of knowledge approaches—prescribed, compliance, adaptive and self-determined—is discussed in turn.

Prescribed

In this quadrant we might expect to see evidence of knowledge approaches being imposed at the organisational level, possibly represented in the way groups and teams operate in business processes. We would expect formal structures and bureaucratic systems for attempting to capture, store and distribute knowledge. Without the terminology of KM might perceive little difference from information systems with a heavy reliance on the capability of technology. We might expect to find strong attempts to measure the value of knowledge through formal measurement systems. We identified the following features that are evident in the prescribed quadrant:

- Formal structure and procedures

RM Consulting recognised that the divisional organisation of the Post Office had constructed some *excellent barriers to stop people knowledge-sharing* and accordingly put in place some of the prescribed approaches to impose knowledge activities, clearly identifying responsibilities:

“You have to have reserve powers, you have to have certain rules and responsibilities to make sure things happen. I don’t think there’s any such thing as a totally empowered organisation. (RM Consulting).”

Talk of reserved powers indicates a rule-based attitude to the nature of management, which has been adopted in the context of KM in the prescribed approach.

- Knowledge as information

Knowledge tended to be discussed by managers whose KM activities had a heavy technical involvement (Jaguar), and to a lesser extent in other imposed organisations such as BT and RM Consulting. However, managers in these companies did not readily discount the tacit and social aspects of knowledge that are excluded from classification as information. Rather they were more comfortable on occasions to describe knowledge and information in the same terms and applications. For example, the manager in RM Consulting was ready to handle knowledge in a manner akin to information:

“Acquire it, shape it, enhance it deploy it, preserve it.”

- Knowledge identified by mapping

Some of the firms mapped the sources of knowledge in the organisation. As indicated above, the managers did not ignore the complexity of knowledge, but they assumed that explicit knowledge could be represented in a map, and the sources of tacit knowledge (i.e. persons) also specified this way:

“We are trying to do rudimentary knowledge mapping... but I don’t think it is as structured or rigorous (as it could be). (BT).”

And this was partly undertaken through the analysis of business processes:

“To map out business processes on the wall and then to review that through a knowledge management lens.”

This suggests organisations are attempting to adopt business process management techniques for the purposes of knowledge management.

- Technology has a strong role in KM (capture/reuse of knowledge and information)

Technology featured significantly in the prescribed knowledge

programmes, and was often represented by intranets and associated technologies. They were central to the early development of knowledge activities in BT:

“We have set up what we call ‘knowledge management infrastructure’ for controlling the way in which information started to grow on the intranets.”

The design engineers in Jaguar were especially confident about the role of technology in KM activities:

“Getting experts to formalise their knowledge in some way...to put a maintenance system around that knowledge.”

Technology is thus central to KM in the prescribed quadrant. Also the language used of “controlling”, “formalise”, and of “maintenance” reinforce attitudes and behaviours of imposition.

- Recognition/Measurement of Intellectual Capital

RM Consulting considers knowledge as the primary asset of the organisation that needs formal recognition and “proof” of value:

“We are trying to start an intellectual capital project...it’s very important to us because we need to prove where the added value is.”

In addition to identifying intellectual capital, RM Consulting attempts to use balanced scorecards for measurement as well:

“We linked the knowledge programme specifically to the key performance indicators to try to build a linkage into the process performance of the organisation.”

Similar approaches were used by BP Amoco and BT. The strong desire to measure knowledge in this quadrant corresponds with a structured and ordered approach to KM.

- KM driving a sharing culture for knowledge

Recognition that knowledge is intertwined with human (and social) aspects of the organisation led the managers to emphasise the importance of cultural change programmes. The theme most managers repeated was that knowledge needed to be shared for wider application and, perhaps, assist towards knowledge creation in the organisation. This could be achieved through KM activities developing a sharing culture, and was frequently associated with formal training programmes as in BP Amoco:

“What you have to do is try and develop some things and promote some behaviour change through doing some activities.”

To summarise, the managers contributing to features in the prescribed quadrant seem more at ease using structure and pro-

cedures to address the way knowledge is captured and shared between the individuals in the social context of the organisation and its business processes. The language they employ of formalising and controlling demonstrates their trust in more mechanistic systems. They evoke rules to try to ensure that the increasing power of technology delivers their goals for KM. However their descriptions of KM, and the way knowledge is handled, can be difficult to distinguish from those which might be associated with information systems. We see the strengths of the prescribed quadrant as being:

- Formal processes and systems ensure knowledge is captured and accessible
- Explores the potential of technology in KM.

Compliance

In this quadrant for imposed knowledge approaches at the individual level, we might expect to find evidence of people being subjected to formal rules and “rituals” for knowledge capture and sharing, and being linked to formal performance measurement systems. The way individuals acquire knowledge is more likely to be associated with formal approaches to training. There are four main features in the organisations that support the compliance quadrant:

- Knowledge sharing as (part of) a formal work contract

Knowledge sharing is considered as a critical knowledge process and organisations in this quadrant deploy formal approaches to encourage. For example, individuals are often required to log their expertise in databases.

“We’ve got a knowledge directory which is our yellow pages (RM Consulting).”

In the Management Consultancy, failure to comply is closely tied with the “performance contract” for an individual consultant:

“Now we will evaluate you and praise you and reward you and acknowledge you and pat you on the head by how much you share your knowledge.”

Individuals may feel that having to share because it is linked to evaluation may conflict with any ethos of a sharing culture.

This formal sharing of knowledge in many cases is associated with the notion of ownership of individual knowledge by the organisation:

“We put in place an MBA programme where people have to write a formal document and sign an agreement to say, ‘Okay, anything you do as part of the MBA we have ownership of it as well.’ (RM Consulting).”

Failure to comply may lead to loss of access to knowledge, in this case though being denied access to education.

- Knowledge sharing as formal ritual

Knowledge sharing is considered as a critical knowledge process in the KM activities of this quadrant, and the organisations deploy formal approaches to encourage its activity.

“We also have lots of conferences where people meet...the real purpose is a ‘sharefair’ or ‘knowledge market’ where people get together...to see what people are doing in different parts of the organisation and the world (Nortel Networks).”

The formality comes through events such as meetings, conferences and briefings.

- Formal access to knowledge

The organisations contributing to the compliance quadrant are associated with formal structure (hierarchy), which suggests that access to some knowledge might be restricted. Knowledge (and information) that is captured and mapped in KM technologies is likely to be characterised and processed for reuse. Access/addition to this knowledge might then be restricted. We inferred that this was the attitude among those organisations contributing to the compliance quadrant.

- Programmed learning

Knowledge skills in the prescribed quadrant can be associated with programmed learning often seen in classroom training. For example, in BP Amoco:

“We did a lot of programmatic coaching—teaching various skills of how to listen, how to reflect, how to give constructive feedback.”

In this approach there is an intention to change attitudes with attempts to encourage individuals to be more reflective in their learning.

In summary it is not surprising that having found evidence for organisational imposed approaches, we should also see how this reflected in the way individuals are treated. We see the strengths of the compliance quadrant as being:

- Individuals understand what is expected
- Reward can be tied to individual performance contracts.

Adaptive

In this quadrant, where empowered approaches to knowledge are employed at the organisational level, we would expect to find evidence of the recognition of informal networks and the social context of knowledge. We would expect that the limited role of technology in KM is recognised, especially in interacting with

aspects of social and tacit knowledge. There would also be an emphasis on the cultural environment for knowledge activities.

Knowledge strategies associated with the adaptive organisation were infrequently observed in RM Consulting or BT, but clearly apparent in Quidnunc and Nortel Networks which were in a dynamic business environment at the time. We found five features which align with the adaptive quadrant:

- Informal Networks (& Communities of Practice)

The managers were fully aware of the significance of knowledge in informal social networks, for example in Nortel Networks:

“Internally you can’t live without your own network—you’d sink without one.”

This was especially a problem for new employees, who lacked both internal and external networks. For example:

“The problem we have is recruiting, particularly senior people who don’t have a network, and it’s very hard for them.”

These and similar issues are often discussed in concepts of communities of practice, which are considered a powerful form of informal social knowledge that create and use contingent knowledge. BP Amoco was one of the few organisations in the study to use the term “communities of practice”.

- Technology has a limited role in KM

The strong awareness of social aspects of knowledge in adaptive organisations is also indicated in their attitude to KM technologies. The organisations strictly consider that technology can capture data and information only. The organisations feel that it has a limited function in the manipulation of knowledge, and its role is restricted to the facilitation of that knowledge.

- Knowledge identified conceptually

In contrast to the imposed organisations, the adaptive group does not rely solely on knowledge mapping. In Quidnunc for example, managers will consider aspects of knowledge over and above “explicit” and “tacit” notions. They include more holistic concepts that might emphasise subjective, as well as objective, aspects of knowledge—using representations (“pictures”) perhaps based on mental associations and metaphors; for instance:

“We have a concept called the Design Spirit which is when you are shaping a solution for a client you have a picture in your head about what this thing is going to be like in terms of its design”.

This indicates greater care in the consideration of definitions and representations of knowledge in the adaptive organisations.

- Measurement encourages awareness/use of knowledge

The use of any “measurement” is to encourage the awareness,

significance and value of knowledge so that it is employed in the most effective manner in business processes. The Management Consultancy recognises knowledge as an asset but focuses on the performance of knowledge processes:

“Measuring intellectual capital...we don't. We're more interested in making sure that the knowledge processes and knowledge people respond to the knowledge needs of the customer.”

In Quidnunc, the company used some scorecard indicators in managers' appraisals:

“In performance appraisals, people get set objectives for the next six months...and as you get more senior those objectives are related to actual knowledge sharing.”

The sense is that even when managers recognise the complexity of notions of knowledge they still find it useful to link the use of knowledge to key performance measures.

- Collapsing barriers to knowledge sharing

Whereas programmes to encourage or demand sharing are a feature of the imposed organisations, they are less evident in the adaptive quadrant. The flat structure of the organisations, and the emphasis on the collaborative working mean that knowledge is freely shared:

“We believe very strongly that the key to getting that right is the culture more than anything else (Quidnunc).”

In summary there is strong evidence that in Quidnunc, Nortel Networks and the Management Consultancy managers are engaging in activities that fit within the adaptive framework. In many respects they are acknowledging the complexity of knowledge and not diminishing the problems they face when trying to improve the way knowledge processes operate. The emphasis on the social level is reflected in the recognition of the importance of informal networks. The strengths of the adaptive quadrant are:

- Accepts and encourages informal networks
- High levels of informal knowledge sharing.

Self-determined

This quadrant, for empowered knowledge approaches at the individual level, is associated with specialist management roles (such as management consultants and specialist teams). The approaches for individuals are supported at the organisational level. We might anticipate that the features in this quadrant relate to greater autonomy in the creation and use of knowledge with value placed on informal sharing of knowledge in an atmosphere of trust. It is the hardest quadrant to explore as we found less

direct evidence of activity in the organisations in our study. However we have identified four features aligning with this quadrant.

- Knowledge sharing motivated by trust

Sharing of knowledge is completely natural, and individuals have strong autonomy to devise solutions and knowledge for novel problems.

“I’m actually more interested in knowing that somebody has acquired a reputation for being an implicit knowledge sharer (Management Consultancy).”

The implication is that individuals are trusted to deploy solutions in their work and knowledge sharing is contingent on trust between individuals. The individuals have a strong psychological contract, partly based on personal knowledge that they develop and use.

- Complexity of knowledge accommodated

Individuals in organisations seen in this quadrant are also able to discuss knowledge in terms that are more advanced than in the organisations of other quadrants. In the Management Consultancy:

“My definition of knowledge is not necessarily everybody else’s.”

This is similar to discussion of knowledge in Quidnunc referred to in the adaptive quadrant.

- Adaptive learning

In contrast to the programmed learning in the compliance quadrant we now find an emphasis on learning that is based on action and reflection so that it is effectively applied and adapted to new situations.

“And we learned this from the Army...when you’re doing what they call ‘movement to contact’...the wrong (approach) would be ‘I did what the book said’...the right (approach) would be doing the right thing out there on the field based on what you know (BP Amoco).”

By implication there is the need for individuals who can learn quickly from experience and make the most of their knowledge in new circumstances.

- Informal access to knowledge

Again in contrast to the compliance quadrant, the sense from the organisations associated with the self-determination quadrant such as Management Consultancy and Quidnunc is that individuals have more informal access to knowledge. The study did not uncover direct evidence of this activity, although it might be anticipated that empowered organisations that recognise informal networks will demonstrate strong informal access to knowledge.

It is perhaps not surprising that we found less evidence of activity in this quadrant as it requires the greatest degree of trust on the part of managers. Where we have found empowered activity at the level of the organisation, we infer there would be activity at an individual level, although this has not always been the case. The strengths of the self-determined quadrant could be seen as:

- High levels of knowledge sharing and problem solving (knowledge creation)
- Advanced understanding of knowledge.

A summary of the levels of activity for each organisation in the four quadrants is shown in Table 2. This results in the following collective levels of activity for all the organisations:

- Prescribed quadrant: 26 instances
- Compliance quadrant: 14 instances
- Adaptive quadrant: 13 instances
- Self-determination quadrant: 3 instances.

The reasons why there is greater activity associated with the imposed dimension over the empowered and the organisational dimension over the individual we discuss in the context of possible trade-offs.

The recognition of “trade-off” in the matrix

The questions we raise about our “knowledge approaches” matrix are: can organisations simultaneously address all four quadrants with equal capability, on the assumption that there are positive aspects associated with each quadrant? Or are there inherent aspects of some quadrants that make trade-offs inevitable and lead to compromises being made? The concept of trade-offs in performance terms is that it might not be possible to achieve more than one goal simultaneously, so managerial choices are necessary.¹⁹ It is recognised that trade-offs may be conscious choices perhaps affected by access to resources or

Table 2. Level of activity in the knowledge approaches

	Prescribed	Compliance	Adaptive	Self-determination
Number of features	6	4	5	4
RM Consulting	6	3	1	0
British Telecom	6	2	1	0
Jaguar	3	0	1	0
Quidnunc	2	3	4	0
Management Consultancy	3	3	2	2
BP Amoco	5	2	2	1
Nortel Networks	1	1	2	0

unconscious because the benefits of each option is not fully appreciated. Also it is possible that what had been seen to be “immutable” trade-offs in practice can be eliminated or greatly reduced. For example, cost and quality were traditionally regarded as trade-offs until Japanese manufacturers demonstrated it was possible to produce reliable products at low cost.

The findings in Table 2 clearly show that all of the organisations in our study demonstrate they are engaged in more than one of our categories of knowledge approaches. Some indication of the degree of engagement is given by the number of features recorded for each organisation in each quadrant. This is done without making any comment on any relative weighing of importance of the features.

It is clear all of the organisations in the study are adopting more than one approach and that there is a slight indication that the majority is engaging the prescribed and compliance approaches to a greater degree than the other two. Could this be because there are trade-offs being made either explicitly or implicitly by the managers? We now examine some possible trade-offs to look for evidence of this happening.

- Imposed versus an empowered approach

Imposed approaches to KM suggest formalised procedures for knowledge processes. In contrast the term empowerment within the approach suggests involvement, elements of self-management and decision making.²⁰ However there are risks that empowerment creates expectations in individuals which cannot be realised. So imposed approaches to knowledge may stifle autonomy for individual creativity whereas empowerment might encourage creativity. Other evidence that the ability to maintain simultaneous managerial control while allowing degrees of empowerment suggest that for many organisations a trade-off is inevitable as the approaches to knowledge in the two domains require different attitudes to the way people work and share knowledge.

We found that three of our organisations—RM Consulting, BT and Jaguar—were not addressing the adaptive or self-determination quadrant while Nortel Networks, Quidnunc and the Management Consultancy were addressing the empowered quadrants. In all these cases some trade-off is perhaps suggested. One view could be that organisations which have a strong bureaucratic tradition are perhaps more likely to be associated with the imposed quadrants, corresponding to the “cognitivist” perspective of organisational knowledge.²¹ RM Consulting and BT share a public sector history and might be more likely to demonstrate such characteristics. We are suggesting that the history of an organisation influences the quadrant(s) it is most likely to be associated with. RM Consulting indicated a belief that a totally empowered organisation is not possible which suggests an acceptance of the choice being made between the rule based and empowered approaches. In contrast, BT expressed the view that the KM initiative might change attitudes and behaviours in the organisation in the way knowledge was shared. This suggests that

if successful, a KM programme may help to reduce the extent of the trade-off.

- A focus on the individual versus the organisation

If managers focus on the knowledge held by individuals they will encourage opportunities for individual learning but potentially at the expense of the needs of the collective knowledge. A concentration mainly on the latter could restrict the creative learning of individuals. Our findings suggest that managers do not perceive a trade-off between the individual and the organisational approaches to knowledge to the extent that they also correspond to the imposed dimension. This could be because they recognise that knowledge sharing and creation address both the individual and the organisational dimensions. We might infer this is because they do not see any conflict of interest between the two.

- Focus on explicit/codifiable versus tacit/uncodifiable knowledge

If managers become overly obsessed with the collection and management of codifiable, explicit knowledge they clearly exclude the richness contained in the other domain. However ignoring the explicit knowledge to manage the tacit could run the risk of loss of control through the lack of ordered management of knowledge needed in key business processes. Here we are at the heart of the KM debate because a concentration on the codifiable in any knowledge approach may simply, at best, lead to improved information systems, whereas high levels of integration of explicit and codified knowledge can also lead to a richness itself for knowledge creation. Managers in the study recognised that the difficulties in “managing” the tacit dimension might tend to start with the explicit. This was not because they saw an inherent trade-off between the two, but rather the difficulty of executing of the tacit knowledge processes.

- Technological versus people knowledge

The technology versus people argument is about the means of managing knowledge processes. The question inherent in the trade-off is the extent to which technology can be used alone or in combination with people at an individual or organisational level. Managers do not believe technology could wholly replace people, or that there is no place for technology in approaches to knowledge. Trade-offs in performance of knowledge processes are thus most likely to occur because of uncertainty by managers about how to get the best from the people/technology mix. This could arise because the expertise about technology lies mainly with information systems experts so that the users in the business processes are unable to get the best from what is installed. The discussion of the technology and human factors above demonstrates that managers in this study do not have a common approach to achieving a balance between these factors. Consequently we can infer that trade-offs are occurring.

We have shown there are distinct strengths for each of our knowledge approaches. Consequently we would expect organisations to be trying to engage with each in order to maximise the

effectiveness of their approaches to KM if they were aware of the potential of the different approaches. This is not the case as we see in Table 2. We suggest trade-offs of the type we have identified are occurring to varying degrees either by intent or by default. If this is the case they restrict the potential to be gained from a holistic approach to knowledge management that engages with all the approaches.

Reliance on technology or human factors?

Another consideration for managers is the role of technology and people. The majority of the managers in the study related human and technical aspects of the organisation to KM initiatives, for example, RM Consulting:

“It’s all about the integration of people, process, technology but strategy and structure as well.”

There was, however, considerable variation in managers’ perceptions about the role of technology, the emphasis of human factors and the appropriate balance between these factors.

Jaguar, associated with the “prescribed” quadrant, has high aspirations for the role of technology in KM. The vision of technology noted above is that it can capture codified knowledge and, eventually, uncoded knowledge as well. The managers in Jaguar recognised the limitations imposed by the “complexity” of knowledge, although they did not discuss aspects of tacit, and social knowledge, and certainly not personal knowledge. Perhaps not surprisingly, one of the human factors that concerned the managers in Jaguar was the ability of their engineers to interact with KM technologies:

“The fundamental difficulty is that the level at which you communicate with the computer in order to impart knowledge to it is not English.”

However, the majority of the companies considered that although the role of technology is influential, it is ultimately a facilitator of human knowledge in the organisation. The manager in BP Amoco was quite adamant about this, although the organisations knowledge activities reflected both “prescribed” and “compliant” strategies. In RM Consulting, the facilitating role of technology extended to human networks including communities of practice:

“The intelligent agents compare the documents you’ve found and searches your own documents with what other people are doing...(from this) we start to create ‘communities of interest’.”

An informative contrast is that between the views in Jaguar and Quidnunc, the software company, which is positioned in the

“adaptive” strategy box. In Quidnunc the managers recognise that tacit and social knowledge cannot be captured by technology, and the objective here is to ensure that managers can identify and register such knowledge. The concern in Quidnunc is less about the employees ability to interact with technology (as it is in Jaguar), but attainment of the social behaviour that encourages the sharing culture and creation of knowledge.

Notably, discussion of personal knowledge in the “self-determined” quadrant is not associated with discussion of technology. Perhaps any systematic component of knowledge creation could be enabled by a technological component, for example, through database functions.²²

A comparison with other models of knowledge activities

We can introduce some further discussion of imposed and empowered approaches to knowledge activities by briefly comparing our framework with other models that describe individual and organisational knowledge. Spender’s typology of organisational knowledge²³ has studied the interplay between the individual and the social (or organisational, as we have selected) and tacit knowledge relative to the explicit. This produces four knowledge domains, of which the last two are particularly significant to the issue of intellectual capital:

- Conscious knowledge—individual explicit knowledge
- Objective knowledge—social explicit knowledge
- Automatic knowledge—individual tacit knowledge
- Collective knowledge—social tacit knowledge.

Automatic knowledge indicates that some tacit knowledge of the individual can represent personal knowledge that has become “frozen into habit”, and might be represented by the application and practice of the skills of craftsmen. The knowledge of the “community of practice”—collective knowledge—reminds us of the sharing and creation of contingent knowledge that can develop through informal relationships. It has a personal identity and interpretation to the extent that it can be affiliated to the identity and behaviours of the community. Thus our framework emphasises aspects of empowered knowledge in the automatic (individual) and collective knowledge types presented by Spender. In contrast, imposed knowledge in our framework draws on the conscious and objective knowledge types with emphasis on explicit knowledge. However, Spender reminds us of the convenience in applying boundaries to knowledge types, and emphasises that his matrix could be interpreted as a mass of human collective knowledge that is heavily implicit, with “patches” or zones of explicit knowledge. This perspective of Spender’s matrix should lead practising managers to realise the difficulty in applying measures of intellectual capital. Nevertheless, we can suggest that our framework should provide managers

with a means to consider and approach Spender's typology. Thus prescribed approaches help to address objective knowledge, compliance approaches address conscious knowledge, adaptive approaches address collective knowledge and self-determination approaches address automatic knowledge.

To a certain extent it is additionally possible to suggest that our framework will support some of the activities in the model of knowledge creation provided by Nonaka.²⁴ The model considers that knowledge creation occurs especially during the conversion of tacit experience to explicit knowledge, and consequently emphasises approaches in the sharing and transfer of knowledge. Although many of the managers in the present study focus on this activity in their organisations, it is notable that few of them discuss actual knowledge creation. According to Nonaka's model, the externalisation of tacit knowledge would match the empowered domains of our framework, especially where there is an emphasis on informal communication. The example in Quidnunc, in which managers use metaphors to communicate the "design spirit" of products in development, is strongly indicative of the approaches supported by Nonaka in knowledge creation.

Key issues for knowledge programmes

The challenge in knowledge management programmes is for managers to understand the strengths of the different approaches to knowledge and the consequences of each for the performance of their business processes.

We suggest managers address five key areas:

- 1 Identify what knowledge within your organisation or key business processes is associated with each domain in the framework i.e. prescribed adaptive, compliance and self-determination.
- 2 Identify your use of technology as a knowledge management tool across the framework.
- 3 Question the appropriateness of your regimes for managing knowledge in each domain.
- 4 Explain the presence of any trade-offs between the quadrants and how these might be affecting organisational effectiveness.
- 5 Develop approaches for eliminating trade-offs or minimising their effect using the activities that we have identified.

Conclusion

Practising managers do not find it easy to develop common languages for organisational knowledge. However they recognise in the changed business environment that knowledge can be a source of organisational advantage and would like to be able to encourage knowledge creation and sharing. We have shown that among the organisations that have developed knowledge man-

agement projects, there are differences in objectives and approaches. Success of these projects for organisational effectiveness is difficult to judge because of the limitations of measurement regimes. Nevertheless we have been able to draw from each case evidence of activities which might contribute to better ways to address knowledge in organisations. The KM Approaches Framework should also help managers in their understanding of other KM models. The notion of trade-offs in approaches we believe is a powerful antidote to complacency.

References

1. P. Drucker, *Post Capitalist Society*, Harper Business, New York, (1993); J. B. Quinn, *Intelligent Enterprise: A Knowledge and Service Based Paradigm for Industry*, The Free Press, New York (1992); A. Burton-Jones, *Knowledge Capitalism: Business, Work and Learning in the New Economy*, Oxford University Press, Oxford (1999).
2. D. Neef, *Making the Case for Knowledge Management: The Bigger Picture*. *Management Decision* **37**(1), 72–79 (1999)
3. Ibid 2.
4. N. G. Beamish and C. G. Armistead Selected debate for the arena of knowledge management: new endorsements for established organisational practices, *International Journal of Management Reviews* **3**(2), 101–111 (2001).
5. R. Grant Towards a knowledge-based theory of the firm, *Strategic Management Journal* **17**, 109–122 (1996).
6. E. Penrose, *The Theory and Growth of the Firm*, 3rd ed., Oxford University Press, Oxford (1995).
7. D. Teece Strategies for managing knowledge assets: the role of firm structure and industrial context, *Long Range Planning* **33**, 33–54 (2000).
8. R. Hall, The strategic analysis of intangible assets, *Strategic Management Journal* **13**, 135–144 (1992); L. Edvinsson and M. Malone, *Realising your Company's True Value by Finding its Hidden Brainpower*, Harper Collins, New York (1997).
9. T. H. Davenport and L. Prusak, *Working Knowledge. How Organizations Manage What They Know*, Harvard Business School Press (1998); M. Venzin, G. von Krogh and J. Roos, Future research into knowledge management, in G. von Krogh, J. Roos and D. Kleine (eds), *Knowing in Firms. Understanding, Managing and Measuring Knowledge*, Sage, New York (1998).
10. M. P. Polanyi *Personal Knowledge. Towards a Post-Critical Philosophy* in The University of Chicago Press, Chicago (1962).
11. J. S. Brown and P. Duguid, Organizing knowledge, *California Management Review* **40**(3), 30–111 (1991); J. Lave and E. Wenger, *Situated Learning. Legitimate Peripheral Participation*, Cambridge University Press, Cambridge (1991).
12. L. Araujo Knowing and learning as networking, *Management Learning* **29**(3), 317–336 (1998).

13. J. C. Spender Competitive advantage from tacit knowledge? Unpacking the concept and its strategic implications in B. Moingeon and A. Edmondson (eds), *Organizational Learning and Competitive Advantage*, Sage, New York (1996).
14. I. Nonaka, R. Toyama and N. Konno SECI, Ba and leadership: a unified model of dynamic knowledge Creation, *Long Range Planning* **33**, 5–34 (2000).
15. M. Venzin, G. von Krogh and J. Roos Future Research into Knowledge Management in G. von Krogh, J. Roos and D. Kleine (eds), *Knowing in Firms. Understanding, Managing and Measuring Knowledge*, Sage, New York (1998).
16. K. S. Cameron Effectiveness as paradox: consensus and conflict in conceptions of organisational effectiveness, *Management Science* **32**(5), 539–553 (1986).
17. E. C. Nevis, A. J. DiBella and J. M. Gould Understanding organizations as learning systems, *Sloan Management Review* Winter, 73–85 (1995).
18. H. Scarborough and J. Swan Explaining the diffusion of knowledge management: the role of fashion, *British Journal of Management* **12**, 33 (2001).
19. C. C. New, world class manufacturing versus trade-offs, *International Journal of Operations and Production* **12**(6), 19–31 (1992); M. Porter, What is strategy?, *Harvard Business Review* November/December, 61–78 (1996).
20. R. J. Paul, B. P. Niehoff and W. H. Turnley Empowerment, expectations and the psychological contract—managing the dilemmas and gaining advantages, *Journal of Socio-Economics* **29**(5), 471 (2000).
21. Ibid 15.
22. Ibid 15.
23. Ibid 13.
24. Ibid 14.