Introduction - The Essentials of Knowledge Management

Introduction: Setting the Scene

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The activity that we now call knowledge management has been practised for thousands of years – probably ever since the first "organizers" in tribes or villages tried to think of ways to stop repeating the same mistakes. Coming up with new knowledge, sharing it with others, making sure it is retained for the future, refining it (learning from experience), understanding how to apply it and deciding when to discard it are all important parts of the human experience.

Nevertheless it was only in 1986 that the explicit attempt to direct and combine these activities was given the name knowledge management, by Karl Wiig. Most of the work on knowledge management in the generation or so since then has been set in an organizational context, and that is the emphasis we take in this book. It is nevertheless worth bearing in mind that many of the principles of knowledge management apply at levels all the way from the individual (personal knowledge management) to nations or even (say) science itself.

Knowledge management sits at the intersection of several disciplines, including organizational learning, computer science, human resource management, economics, psychology and strategic management. As a result, it is not very surprising that there is no single agreed view of what knowledge management is.

Indeed, some would go so far as to say that managing knowledge is not possible, and that the best that can be achieved is managing human "knowers." Perhaps the only aspects that everyone agrees on are that knowledge management is (at best) difficult, and that any knowledge management initiative in an organization has to be tailored to the particular context of that organization at that time.

Knowledge management as a field acquired the status of a management "fad" in the mid- to late-1990s, with an explosion in the number of books and articles published about it, and it is fair to say that it has both benefited and suffered from this status. Nevertheless, unlike some other management fads, it has demonstrated its staying power, and is widely practised and studied worldwide today, even if not always under the precise name knowledge management.

The aim of this book is to review the field of knowledge management with an operational research/management science mindset, encompassing both "soft" and "hard" aspects. This implies a holistic approach that gives a broader perspective than one based on any single viewpoint such as that of computer science or organizational learning. The various chapters represent the best knowledge management articles published in the 21st century in the journals *Knowledge Management Research & Practice* and the *European Journal of Information Systems*. All have undergone a rigorous double-blind review process, and the contributing authors include Ikujiro Nonaka, perhaps the biggest name in the knowledge management field, as well as others with equal reputations in associated fields such as George Huber (decision support) and Richard Baskerville (information systems). The contributing authors are based in nine different countries on four continents, showing the global nature of knowledge management.

The chapters are organized by topic, rather than chronologically, running from the theoretical foundations of knowledge management through to some of the newest developments in technology. After the two Foundations chapters, theory and practice are closely intertwined in the subsequent sections, with six of the chapters featuring substantial case studies.

While the diversity of the field means that there are some differences in the standpoints taken in the various chapters, we have tried to choose the contributions so that there are no outright contradictions. This diversity also means that we do not recommend a particular sequence or sequences in which to read the chapters, since the needs of each individual reader will be different. However, if you are at all interested in the theory, then please do start with the Foundations chapters!

We now go on to introduce the contributions in each section in turn.

Foundations

The most central concepts in the field, naturally, are knowledge, management and how they come together as knowledge management. We think that readers of this book are already likely to have some awareness of what management entails, whether theoretical or practical, so we do not specifically cover that here. Knowledge, however, is a different matter. Everyone has an everyday familiarity with the term, but relatively few people have thought rigorously about it, and such thinking is not easy. Knowledge itself, as befits something so fundamental to being human, has been discussed and debated for well over two thousand years without coming to a full understanding. Many of the basic ideas and questions go back to ancient Greek philosophers such as Aristotle, Plato and others (see Müller-Merbach, 2008, for a useful brief summary). On the other hand, recent research into artificial intelligence

has shed light on what we do (and do not) understand about human intelligence and knowledge. This has generated such a vast literature that consideration of knowledge here needs to be restricted to the context of knowledge management.

For the Foundations section, our two chapters therefore cover firstly knowledge in the context of knowledge management and secondly the theoretical basis for the field of knowledge management.

Chapter 2, the knowledge Foundations, is by John Mingers, chosen both because it addresses knowledge specifically in the context of knowledge management, and because Mingers' own broad experience (being based in a business school with a CV including operational research, information systems, academia and practice) fits nicely with our underpinning philosophy in this book.

The particular motivation behind the chapter's original publication was that the issue of truth in people's conceptualizations of knowledge had been insufficiently covered in previous literature. As Mingers points out, many writers in the field implicitly or explicitly take the positivist stance that there is a single objective truth, on which basis a "piece" of knowledge can be said to be right or wrong, or perhaps still under evaluation. From a critical realist or an interpretivist stance however, the truth of something is a much more complex issue, and in addressing it, Mingers necessarily gives much consideration in his chapter to the issue of what it means to say "I know," offering examples of thirteen different senses of that verb. These range, for example, from direct perception ("I know it is raining") through to being acquainted with emotions ("I know how stressful an exam is"). The thirteen senses can be grouped into four categories: propositional (knowing that…), experiential (knowing…), performative (knowing how to…) and epistemological (knowing

why…). These then correspond to four different conceptions of, and criteria for, "truth," which Mingers justifiably prefers to label as validity.

The issues Mingers raises provide the lead into Chapter 3, the knowledge management Foundations, by Richard Baskerville and Alina Dulipovici. This is, for obvious reasons, the longest in the book. It traces the roots of the subject of knowledge management in various related disciplines, and how concepts from those disciplines have come into knowledge management and been further developed there, in the form of a taxonomy. They point out that, in the research literature at least, 1995 can be regarded as a watershed for knowledge management, in that more publications on the topic appeared in the year 1996 alone than in all the years up to and including 1995.

The Baskerville and Dulipovici chapter is divided into three main sections, focussing in turn on the theories underpinning the rationale for knowledge management, the theories underlying the various knowledge management processes, and the theories supporting evaluation and measurement in knowledge management. These theories come mainly from information economics and strategic management for the rationale; organizational culture, organizational behaviour, organizational structure and artificial intelligence for the processes; and quality management and organizational performance measurement for the evaluation aspects.

Work explicitly described as being within the knowledge management field has then produced further foundations in the form of new concepts such as the knowledge economy, knowledge alliances, knowledge culture (in an organization), the knowledge organization, knowledge infrastructure/architecture, and knowledge equity. Readers who already have a little knowledge about knowledge management

may be especially interested in the connections between different theories shown in Table 3.6.

Armed with this taxonomy of the concepts supporting knowledge management, we go on to consider more specific aspects of the field. Generally the earlier chapters deal with the more strategic level, the longer term, and more "timeless" issues, while in later chapters we move towards more operational matters and future opportunities.

Strategic Issues

Having explained what we believe people in the field are talking about, the next section concerns the strategic issues of managing knowledge. Our decision to start with considerations of strategy needs to be understood as being motivated by the breadth which that implies, not that knowledge management in an organization should be identified with a top-down approach. Far from it, in fact. As is clear from the chapter by Nonaka and Toyama, and as we have discussed ourselves elsewhere (Edwards and Kidd, 2003), all levels in the organization have a part to play, and knowledge management initiatives imposed top-down are unlikely to succeed.

Any thinking about managing knowledge must logically begin with knowledge creation, since without that there is nothing for any cycle of knowledge management to start from. Nonaka and his co-workers have concentrated their research for more than two decades on the theory and practice of knowledge creation, and the book by Nonaka and Takeuchi (1995) is regarded as one of the drivers for the explosion of interest in knowledge management already mentioned. Thus we open this section with a chapter by Ijukiro Nonaka and Ryoko Toyama as Chapter 4.

The chapter takes the two fundamental aspects of the knowledge creation theory they have developed, the SECI model and the concept of *ba*, and extends them by incorporating dialectical thinking.

The SECI model was in part inspired by the writings of Polanyi (1966) on tacit and explicit knowledge. Tacit knowledge is in the mind of the knower, and can never be entirely accessed; explicit knowledge can be shared in the form of documents, diagrams, computer routines and so on. The SECI model (see Figure 4.1) conceives of knowledge creation as a process of four modes of conversion between tacit and explicit knowledge, encompassing Socialization (sharing and creating knowledge through direct experience), Externalization (articulating tacit knowledge through dialogue and reflection), Combination (systemizing and applying explicit knowledge and information) and Internalization (learning and acquiring new tacit knowledge in practice). Within an organization, this process spirals upwards from the individual to the group and eventually the whole organization.

The process needs a place in which to happen, and the term *ba* is used to describe it: a dynamic context in which knowledge is shared, created and utilized. Place is interpreted in the broadest possible sense here – the Japanese word *ba* has no exact English equivalent, and has been adopted widely in the knowledge management literature. *Ba* could be physical, virtual or even philosophical (see Figure 4.2 and Chapter 8 by Magnier-Watanabe et al).

Dialectical thinking, developing a single viewpoint from contradictory opinions, is then used to provide a yet broader view of the knowledge creation process than the SECI model and *ba* alone. This views a firm's strategy and organization as an ongoing dialectical process between the various agents that constitute the firm, rather than as a logical analysis. As Nonaka and Toyama put it themselves, "An organization

is not an information-processing machine that is composed of small tasks to carry out a given task, but an organic configuration of *ba*" (p. 000).

After this overview from the school of one of the thought leaders in knowledge management, the section goes on to present contributions on four specific aspects of knowledge management strategy: bringing in knowledge from outside the organization; how knowledge might usefully be measured; the problems of discarding knowledge that is no longer relevant because the context has changed; and the challenges of balancing local and global knowledge that face multi-national organizations.

Bringing in knowledge from outside the organization is well-known to be challenging; the "not invented here" syndrome is familiar to everyone in management. The rigorous conceptualization of the issue is based on the notion of the absorptive capacity of the organization. This was originally proposed by Cohen and Levinthal (1990) as "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (p. 128). In the subsequent 25 years, there has been extensive study of this from a theoretical point of view, especially in the organizational learning and knowledge management fields. However, it has proved hard to tie down the concept precisely enough to allow a reasonably accurate assessment of what an organization's current absorptive capacity is. A step forward was the identification by Zahra and George (2002) of four dimensions of absorptive capacity: acquisition, assimilation, transformation and exploitation. Chapter 5, by Jean-Pierre Noblet, Eric Simon and Robert Parent, uses these four dimensions as a basis for operationalizing the concept of absorptive capacity from the point of view of dynamic capabilities, defined by Teece, Pisano and Shuen (1997) in terms of "the

ability to integrate, build and reconfigure internal and external competencies to a changing environment" (p. 516).

Noblet et al. look for "variables" (by no means all quantitative), based on the four dimensions of Zahra and George, in an analysis of interviews carried out with CEOs of ten French companies, all of them innovative small- or medium-sized organizations. Their findings suggest that the three factors of greatest importance in the creation of new knowledge are: the creation of an environment conducive to effective interaction (in other words, a suitable *ba*); the presence of leaders with the skills necessary to ensure needed integration and direction in situations of creative chaos; and the capacity for ongoing self-challenge. The study validates the grid of 30 variables shown in Table 5.2 and thus provides a tool for organizations to use in future assessments of absorptive capacity.

Taking the theme of measurement further, this time concentrating on the quantitative, brings us to Chapter 6, by Ettore Bolisani and Alessandro Oltramari. This tackles the problem of, quite literally, accounting for knowledge. A generally accepted method of doing this would significantly ease the problem of judging the effect of knowledge management initiatives, or an absence of them, on the "bottom line" of an organization. This has been an active area of the literature since the inception of knowledge management, but remains controversial, with criticism of both the soundness and the usefulness of previous approaches.

Bolisani and Oltramari first present a critical review of the methods of knowledge accounting already proposed in the literature, and their limitations. They then go on to set out their own method. This is based on treating knowledge as an object, representing a change in perspective from the previous two chapters, both of which focussed mainly on the knowers rather than the knowledge, thus taking a

viewpoint of "knowledge as process," although both did also include some elements of "knowledge as object." Treating knowledge as an object enables knowledge accounting to use a stock-and-flow approach, analogous to that used in traditional accounting. This in turn makes possible the use of charts and metrics analogous to those of traditional accounting.

The notion of knowledge stocks is straightforward, even if the extent to which tacit knowledge might be included in them is not. However, knowledge flows offer more variation. The knowledge might, for example, flow as part of the transfer of a physical object, either in the physical object, or as an associated interaction; or it might flow as an object in itself, such as provision of training, consultancy or information. Bolisani and Oltramari give simple examples of knowledge accounting, using a knowledge balance sheet, in two situations: knowledge sharing, where both parties in a transaction have access to the same knowledge object, which becomes part of the knowledge stock of both; and knowledge delivery, where one party creates a knowledge object to become part of the other party's knowledge stock.

The fourth chapter in this section, Chapter 7, is by Juan Cegarra-Navarro, Anthony Wensley and María Teresa Sánchez Polo, concerning the topic of forgetting knowledge, or unlearning, as they call it. This is a vital aspect of knowledge management, since much knowledge potentially has a limited lifespan. Thus unlearning/forgetting is relevant to all organizational situations except the implementation of a completely new system or operation, yet except for the literature on change management, it is often neglected.

The sector that Cegarra-Navarro et al. deal with is that of healthcare. As they explain, "Many researchers who have investigated healthcare organizations have

indicated that healthcare professionals are likely to be burdened with outdated knowledge" (p. 000).

Offering healthcare in the patient's own home which would previously have only been available in a hospital is a direction in which many health providers are moving, especially public healthcare providers. The particular situation under consideration in this chapter is that of the acute care services delivered by HHUs (Hospital-in-the-Home Units) in Spain.

The change in context which this represents from in-hospital provision is clear. Cegarra-Navarro et al. argue that this means working with new knowledge, new practices and new technology, resulting in a need for adaptation of existing knowledge and therefore full or partial unlearning. They identify three types of intentional unlearning activity in the home healthcare environment, which they name as awareness, relinquishing and relearning.

They then go on to develop a framework for assessing the unlearning context, consisting of three components: the perceptual lens(es) through which individuals view situations; the changing of individual habits and assumptions; and the consolidation of emergent understandings into existing knowledge and knowledge structures. They also identify the key enablers for success in each of these three components, and finally apply the framework to the HHU initiative.

The section concludes with Chapter 8, by Rémy Magnier-Watanabe, Caroline Benton and Dai Senoo. Magnier-Watanabe et al. examine knowledge creation, and knowledge management processes more broadly, in an organization in the pharmaceutical sector. Their study covers its Japanese headquarters and its three largest subsidiaries, in the USA, France and China. The aspects they consider follow the theoretical constructs from the Nonaka school of thought about knowledge

management, which we have already mentioned in introducing the chapter by Nonaka and Toyama, including the SECI model, leadership, culture and *ba*. Data were collected by a questionnaire survey which obtained more than 2600 responses in total. Regression models were then constructed for each of the four countries, with the five organizational factors – *ba*, leadership, organizational culture, organizational control, and work styles – as independent variables, and the four SECI knowledge conversion modes as dependent variables.

Magnier-Watanabe et al. find that there are considerable differences between the four countries. One of them reflects their different "histories" of knowledge management: the Japanese headquarters began major knowledge management initiatives in 1998 at a time when the international subsidiaries had only recently been established. As a result, the four SECI modes are much better balanced in Japan than elsewhere, reflecting the effect of continued knowledge management training. A lack of knowledge management training leads to low levels of externalization and combination, the more important conversion modes at the organizational level. The level of knowledge management training does not, however, explain the differences between the most influential factors in the regression analysis, which were formal *ba* in the subsidiaries in the USA and China, clear objectives in the subsidiary in France, and a self-directed vision in the Japanese headquarters. Magnier-Watanabe et al. are careful not to claim that these correspond to general national differences, only that they apply to the organization under study. Nevertheless, both their method and their results will be of considerable interest to those concerned about national differences in knowledge management processes, as well as those more generally concerned with knowledge creation.

Understanding Knowledge Transfer/Sharing

Knowledge sharing remains one of the most researched topics in knowledge management (Ribière and Walter, 2013), but as with the concept of knowledge, a full understanding still eludes us. The two chapters on knowledge sharing/transfer that we include are by George Huber and Jialin Yi, and both are concerned with effectively linking the intention of a knowledge management initiative at the strategic level to its implementation at the operational level.

A major theme of Huber's writings (e.g. Huber, 2004) is that people too often assume that the future will be like the past, and as a result what they learn from history and experience is not always appropriate. Chapter 9 by Huber included here looks at how to motivate people to participate in an organization's knowledge management system, especially one in which a knowledge repository (for storing explicit knowledge) makes up a substantial component. He points out that many studies reported in the literature are single cases, making it difficult to tell, for example, what management practices have what effects under what conditions, or what interactions, especially interference, there might be between different practices.

Huber is very much concerned with the balance that needs to be struck in managing knowledge between the human and organizational issues, and the technological ones. This is related to the views of "knowledge as process" and "knowledge as object" mentioned earlier, and Huber's concern is a reflection of the way that many early knowledge management initiatives were strongly technology-driven. He looks particularly at the motivational issues both in the initial adoption of knowledge management systems and in their continuing use. He raises a set of eight questions, intended not only as a research agenda for academics, but also for practitioners, "to provoke thinking and debate about what their organization ought to

be doing to facilitate transfer of knowledge" (p. 000). The eight questions cover: motivation to contribute to and make use of the systems, both extrinsic (reward) and intrinsic (social-psychological); making the systems more effective, especially when users have varying backgrounds; and linking the different approaches to motivation to effectiveness in system construction and use, particularly when more than one approach is used simultaneously. Although originally published in 2001, most of the issues that he identifies are still live ones today.

Jialin Yi offers a very specific step forward in Chapter 10, by developing and validating a scale for measuring knowledge sharing behaviour (KSB). This is a crucial element in understanding the success (or otherwise) of a knowledge management system, and so is very much in tune with Huber's philosophy that better understanding is needed. Yi set herself the task of developing a new measure of KSB with desirable psychometric properties – a well-developed KSB scale with a sufficient level of reliability and validity. She begins by discussing the various dimensions that might be seen as forming part of KSB, where she points out that previously there had been no clearly agreed definition of the concept, as with many other concepts in knowledge management. A definition was therefore essential, and she proposed:

> Knowledge sharing behavior is a set of individual behaviors involving sharing one's work-related knowledge and expertise with other members within one's organization, which can contribute to the ultimate effectiveness of the organization. (p. 000)

From this foundation, she goes on to develop a scale with four dimensions and 28 items, being careful to distinguish it from the somewhat related (and relatively well-researched) concept of organizational citizenship behaviour (see for example Organ, 1988).

The four dimensions relate to Written Contributions, Organizational Communications, Personal Interactions, and Communities of Practice, respectively. Yi goes on to validate the scale in two stages, the first using expert judgement, and the second involving a survey of employees of a high-technology company in the USA. She thus achieves her goal of constructing a validated KSB scale for others to use.

We continue with the theme of linking the strategic and operational levels of a knowledge management initiative in the next section.

People or Technology Approaches?

We return once more to the "knowledge as process"/"knowledge as object" distinction with this question, but it is really a rhetorical one, as we are convinced that the only tenable answer must be "both" as regards all planning of knowledge management initiatives. It's rather like planning a journey – are you going to travel on foot, or use some form of vehicle (technology)? Most business journeys involve a mixture of both – and taking the analogy further, often involve more than one type of technology.

The two chapters in this section do, however, illustrate the two extremes of the spectrum. From the people/process end, Andrew Cox considers storytelling in Chapter 11; while from the technology/object end, Antonella Padova and Enrico Scarso study the management of large amounts of knowledge objects in Chapter 12.

It is worth noting that despite the difference between the two approaches, both chapters are based on examples from large multi-national organizations, illustrating the need for a knowledge management initiative to be tailored to the specific organization concerned. Ever since the pioneering work of Hansen, Nohria and Tierney (1999) on knowledge management strategy, it has been clear that even firms

of similar size within the same sector might need to take very different approaches to managing knowledge. Hansen, Nohria and Tierney identified the two fundamental knowledge management strategies with the two ends of the "people or technology" spectrum: personalization (people-to-people, stressing knowledge as process) and codification (people-to-documents, stressing knowledge as object).

Cox's chapter is based on Xerox, "the document company," to use their own strapline. The story of how photocopier engineers at Xerox shared their knowledge is one of the best-known case study examples in the history of knowledge management. Yet, in being cited and discussed so often, the story has actually taken on a life of its own, somewhat different from that in the account originally written by Orr (1996). Cox's chapter addresses this "story of the story" or "narrative of the narrative" and makes some telling points for knowledge management as a whole, not least that there are now several conflicting variants of this "one" story.

Cox contrasts the oral, socially improvised and collectively owned story in Orr's book, with a later Xerox knowledge management "story" (in a structured database) that is encoded, formally validated and individualistic; a move away from knowledge as process towards knowledge as object. He goes on to connect changes in the stories being told about Xerox to changes in Xerox's commercial positioning over time, affecting the "ideology" behind each story. One of his key conclusions is that accounts of a case study need to try to capture as much of the complexity of the case as possible rather than aim to present one "true story." This links back well to the issue of the truth, or validity, of knowledge debated in Mingers' chapter.

Turning to Padova's and Scarso's chapter, we have already seen the potential accounting benefits of knowledge as object, covered in the chapter by Bolisani and Oltramari. Padova and Scarso look at the problems of managing the stocks of

knowledge that this approach implies. These problems are naturally magnified for large and dispersed organizations.

Their chapter is a case study of knowledge management activity within the worldwide consultancy organization Ernst & Young. Ernst & Young have been active in knowledge management since the early 1990s, and Hansen, Nohria and Tierney chose Ernst & Young as one of their examples of an organization adopting a codification strategy for knowledge management. The study by Padova and Scarso was motivated by the decision by Ernst & Young to consolidate their longstanding knowledge management activities into "an integrated globally consistent knowledge capability" (p. 000) called EY Knowledge. This offered many benefits, such as the time saving of a "one stop shop" and the standardization of terminology and systems. However, among the potential disadvantages of this move were the issues of local vs. global knowledge that we have already seen in the chapter by Magnier-Watanabe et al.

Padova and Scarso identify the specific cognitive issues raised by this attempt to standardize terminology and working practices, and the organizational issues surrounding the day-to-day use of the larger, centralized system. They conclude that managerial skills are the key to overcoming these problems, and that Ernst & Young's success in this initiative depended to a great extent on vision, adaptability and open-mindedness.

It is also a salutary lesson that even acknowledged pioneers of knowledge management such as Ernst & Young are still finding it challenging after almost two decades!

Newer Technological Developments

Chapter 12 by Padova and Scarso stresses one of the key messages of this book: that technology is never the whole "answer." All the same, developments in technology continue to bring new possibilities and opportunities into the knowledge management field, and our final section takes a look at some of them.

The section includes three developments that have all come to prominence since the boom in interest in knowledge management began in the mid-1990s. The first of them, the construction of ontologies, is more for the direct use of those specializing in supporting knowledge management, but the other two will be familiar to almost everyone from everyday life: wikis (which also feature in the ontology construction chapter) and social networks. This familiarity can be both an advantage and a disadvantage as regards their use for/in knowledge management: "familiarity breeds contempt" as the old saying goes.

An ontology is an explicit specification of a conceptualization – "an abstract, simplified view of the world that we wish to represent for some purpose" (Gruber, 1995, p. 908). It thus represents an attempt to formalize and categorize the terminology of a particular domain, and if successfully constructed and maintained, can serve as a central element in a codification strategy for knowledge management. In Chapter 13, Tao Guo, David G. Schwartz, Frada Burstein and Henry Linger look at ways of capturing the body of knowledge in a domain in an ontology.

The traditional approach to this has been to identify a group of experts and authoritative documentation in the domain concerned, and codify the knowledge from those people and documents. This is a difficult and time-consuming process, dependent on the skills of those people eliciting and codifying the knowledge. Even if part of the process can be automated, for example by text mining on the

documentation, Guo et al. point out that this approach still neglects "the social foundation of domain knowledge" (p. 000). An alternative approach to part of this task is to use an appropriate Community of Practice (Lave and Wenger, 1991) for the domain to construct what is now called a folksonomy: a taxonomy produced by collaboration. However, folksonomies lack the formal basis required for a true ontology.

Guo et al. review these approaches in more detail, and go on to propose a semi-automated learning approach to ontology creation that brings in the collaborative element. It does this by using what is surely the largest online collaborative effort: the Wikipedia. In a test example, an ontology constructed in one hour by a non-expert ontology engineer using this approach was compared with the "Gold standard" of the two largest traditionally constructed ontologies, each involving many person-years of effort. It covered more than 90% of the concepts in the traditional ontologies.

Moving on to a specific organizational use of wikis rather than the public and potentially all-encompassing Wikipedia, in Chapter 14 Paul Jackson and Jane Klobas present a case study of wiki installation and use in an organization in the mining sector.

Their approach to understanding the case is based on institutional theory, and demonstrates the cross-disciplinary viewpoint that we have been adopting. They select what they call "postulates" or "scripts" from a range of relevant disciplines to help understand the case data. For the whole organization, these include characteristics of the minerals and mining sector, general management, performance management, and information management. There are also scripts relating to specific groups of staff, among them scientists and IT trainers, and especially those responsible for safety.

Jackson and Klobas find a great deal of enthusiasm for wiki use, but also some barriers. These include the reluctance of contractors to help build intellectual capital for the organization; a top-down control structure which means that anything not explicitly mandated has low priority; and the difficulty of quantifying return on investment in a tool such as a wiki. They found that groups such as scientists and health professionals, who value sharing knowledge, made much more use of the wiki than the safety managers, where tight information management is needed to meet regulatory requirements. Overall, they conclude that "organisational culture is a critical success factor in the implementation of knowledge sharing technologies such as wikis" (p. 000).

Placing the social context even more centrally than Guo et al. did, Julia Nieves and Javier Osorio study the role of social networks in knowledge creation in Chapter 15. Their chapter provides a timely and very valuable reference source for those working in knowledge management, by carrying out an extensive review of the hitherto somewhat disparate literature on how social networks influence knowledge creation and innovation, concentrating on papers that offer empirical evidence. As (we believe) has been agreed for knowledge management generally, there is no "one best way" to incorporate social networks in an organization's knowledge creation and acquisition strategy. For example, low redundancy of ties (network members having few links with partners that are similar to each other) is associated with higher rates of innovation, but higher network density (the proportion of all possible connections between the network members that currently exist) facilitates sharing knowledge and hence knowledge creation.

Nieves and Osorio find that the most appropriate configuration of an organization's social network depends, amongst other factors, on its proposed balance

between exploration and exploitation of knowledge. Exploitation, generally associated with incremental innovation, is refining and making better use of existing knowledge; exploration, generally associated with radical innovation, is searching for new knowledge (March, 1991). The most important point, they conclude, is that the networking strategy nevertheless needs to be planned, not just left to happen.

In Conclusion…

For a suitable summing-up we need look no further than the conclusions in Chapters 14 and 15, both of which can safely be generalized: organizational culture is a critical success factor in any knowledge management initiative, and knowledge management initiatives need to be planned, not just left to happen. Yes, knowledge management is difficult, and very context-specific, but by putting effort into planning, enabling, facilitating, supporting and above all listening to everyone in the organization, at all levels, you can make it succeed. We hope that the contributions in this book will help you to do just that.

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