Preface

INTRODUCTION

The purpose of this book is to collect and to present the results of theoretical and empirical research into various aspects of Knowledge Management (KM), innovation and, especially, the conjunction of KM and innovation. To this end, chapters are included from both academics and practitioners, and the contributions represent diverse views and versions of KM and innovation. It is this richness and diversity that makes the topics so fascinating and, it can be contended, so important to the future work of academics and practitioners in a variety of fields alike. It is possible to conclude that both topics—KM and innovation—are different aspects of the same phenomenon, which is the use of “human capital” to generate new ideas and to promote creativity. It is axiomatic that advances and innovations in science, technology, industry, education, and the arts all begin at one source: the knowledge of the people on whom businesses and organizations of all sorts rely for their new products, services, technologies, and systems. The potential audience for this book is therefore very broad. The term “Knowledge Management” (KM) is most frequently used to describe the range of practices and activities that are used in a variety of organizations to identify, create, represent, store, disseminate, and encourage the adoption of relevant human insights and experiences. Such insights and experiences (i.e. the knowledge) may be embodied in individuals’ minds or embedded in a group’s or an organization’s artifacts, processes, and practices.

KM research has for some time embraced the fields of business administration and management, information systems and technology, learning and psychology, and library and information sciences (Alavi & Leidner, 1999). More recently, other contributions to KM research have included applications of KM in public health and public policy. Most large commercial companies and many non-profit organizations have dedicated considerable efforts and resources to KM, often as a part of their business strategies, IT strategies, or even human resource management (HRM) strategies (Addicott et al. 2006). Consulting companies have grown up to provide advice and expertise on KM to these organizations at strategic and operational levels. KM efforts to date have typically focused on organizational objectives such as improved performance, competitive advantage, innovation, and quality improvement. KM initiatives often overlap with existing directions with organizations such as organizational learning (OL), Total Quality Management (TQM), and even Business Process Re-engineering (BPR). KM may be distinguished from these disciplines (and others) by a greater focus on managing knowledge as a strategic asset and on enabling the sharing of knowledge. KM efforts can therefore help individual workers and groups to share valuable organizational learnings, to reduce redundant work (e.g. avoiding reinventing the wheel), to reduce training time for new employees, to retain intellectual capital when employees leave and to adapt continually to changing environments (Thompson & Walsham, 2004).
There are currently a number of schools of thought or movements that have had an influence on Knowledge Management and its relationship to innovation, the following being among the more important:

- The information theory movement, usually associated with the frequently-cited work (Chun, 2003) by Davenport and Prusak (1998), Nonaka (1991), and later with Takeuchi (1995). This work has been an important influence on KM and includes later developments by Probst (1998), Von Krogh (1998), and Malhotra (2000) which cite the process of KM as an important enabler of innovation;
- The collaboration school of KM that focuses on CoPs and collaborative ICTs, originating from research at Lotus (and later IBM) by Wenger, McDermott, and Snyder (2002), that views knowledge as a commodity that relates directly to interpersonal contact and the communication of new ideas;
- The intellectual capital movement with Edvinsson and Malone (1997), Sveiby (1997), and later developed by Bontis (2002), which views knowledge as valuable corporate resources and assets that can provide competitive advantage through innovation;
- The social network analysis school, typified by Krebs (2008) and influenced by the work of Borgatti with Cross (2003) and with Carboni (2007), that concerns the theoretical mapping and measuring of the relationships and flows of information between people, groups, and organizations, which can be an important source of invention and innovation;
- Narrative approaches associated with Snowden (2000a, 2000b), Boisot and Canals (2004), Spender (2007), and others. Variations of this approach are described by Snowden (2004), Boje (2001), and others as a form of KM.

**INNOVATION AND INVENTION**

Innovation is often equated with creativity and is generally understood to be the successful introduction of a new artefact, method, or process. The ideas behind the development can come from a deliberate process of deductive development from a knowledge base or from an intuitive and even accidental ‘bright idea’ in which it may be difficult to identify the role of knowledge. However, there generally appears to be a fundamental link between knowledge and innovation. Luecke and Katz (2003) believe that “... innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services”. Amabile, Conti, Coon, Lazenby, and Herron (1996) suggest that innovation is related to creativity (as all innovation begins with creative ideas) but is not necessarily identical to it. Action is required to develop the creative ideas to make some tangible and lasting contribution, and it is this contribution that is defined as innovation. We define innovation as the successful implementation of creative ideas within an organization (Amabile et al., 1996). In this view, creativity (whether by individuals and teams) is a suitable starting point for innovation, but creativity may not always lead to successful innovation. For innovation to occur, then, something more than the creative generation of an idea or insight is required, as the insight must be enacted to make a real difference.

Innovation is also described as a part of a management process that may need to draw on other organizational resources that creativity does not. Davila, Epstein, and Shelton (2006) believe that “Innovation, like many business functions, is a management process that requires specific tools, rules, and discipline”. This appears to place emphasis on the general organizational processes and procedures for generating, evaluating, developing, and acting upon creative insights to produce significant organizational improvements. Creativity may therefore be seen as the basis for innovation and innovation as the successful implementation of creative ideas (Amabile et al., 1996). Davila et al. (2006) appear to confirm that it is
this ‘bringing ideas to life’ in an organizational context that makes innovation the distinct undertaking it is. Many of the contributions to this book contend that this undertaking or organizational process requires knowledge as an input to the innovation process, uses knowledge to make the process efficient and also produces knowledge as an outcome of the process in the form of experience and organizational learning. The various contributions to this book tend to confirm this view in a variety of organizational contexts.

Fagerberg (2004) notes that “An important distinction is normally made between invention and innovation. Invention is the first occurrence of an idea for a new product or process, while innovation is the first attempt to carry it out into practice”. Innovation, in contrast, occurs when an invention or an idea is used to change how society functions, how organizations are structured, or how people live their lives. Innovation is also distinct from improvement in that it permeates society and can cause reorganization, and from problem-solving in that it should have more lasting and far-reaching effects. The term ‘innovation’ therefore refers to a new way of doing something or achieving new ends, perhaps by radical and revolutionary or by more gradual and incremental means. This may be through changes in modes of thinking, through new products and/or processes, or the way in which organizations are structured and managed. A distinction is sometimes made between inventions, which are ideas put into practice, and innovations, which are inventions applied successfully over time (McKeown, 2008). On these terms an invention may be completely new (e.g. based on a “step-change” in thinking or technology) and yet not be an innovation if it does not have lasting influence (e.g. start a trend) or contribute substantially to a body of knowledge. In many fields, an invention must be substantially different from its predecessors to be classed as innovative and must have a measureable and valuable effect. In business the innovation may have to increase the value of a product or service in the eyes of the consumer or producer. The goal of invention is therefore to effect a positive change—to make something better—and innovation leading to increased productivity is the fundamental source of increasing economic wealth.

Although innovation is considered to be the output of the process of invention, in a KM/innovation context it is usual to focus on the whole process, from the origination of an idea, through its transformation into something useful, to its implementation and subsequent effect on the environment. While innovations typically add value or produce benefits, they can have disruptive or destructive effects as innovations replace outdated or obsolete products, organizational forms, and social practices. It is therefore possible that organizations that fail to innovate effectively may be superseded by those that do. Conversely, as invention and innovation may harm the organization that bears the cost and efforts of the process, innovation projects may involve a degree of risk. A key challenge in innovation projects is to achieving a balance between process and product innovations—where process innovations tend to involve a business model which may develop shareholder satisfaction through improved efficiencies, while product innovations develop customer support however at the risk of costly research and development (R&D) that can erode profitability and therefore shareholder return. Many of the contributions to this book, by definition, describe current applications of KM and innovation, but which are founded on established KM models, processes and technologies that have developed over time. It may therefore be useful to describe the generations through which the subject of KM has progressed in reaching its present state.

‘GENERATIONS’ OF KM AND INNOVATION

The original generation of thought on KM and innovation focused on the mental process of understanding, problem-solving, and generating new ideas. This may therefore be termed the ‘Psychological’ generation
of KM. Early work on creative mental processes by Michael Polanyi challenged the previous “scientific” view that innovation (at least in science and technology) was a completely logical and deductive process—a cold, logical progression from one stage of the development of a new idea to another. In his seminal work “Personal Knowledge: Towards a Post Critical Philosophy” Polanyi (1967) neatly summarizes the thesis of his later life as a philosopher (he was originally a chemist) that creative or innovative acts often arise from “unscientific” stimuli such as guesses, hunches, and emotional commitments. This view challenged the commonly accepted position that science is value-free, and it is possible to see creative tension between Polanyi’s approach to knowledge and enquiry and that of Thomas Kuhn, who later held that typical scientists (and, by extension, technologists) are not independent and creative thinkers. On the contrary, they accept and react to what they have been taught (especially in the form of accepted theories) and apply their knowledge to solving the problems that such theories suggest. In this view scientific people are problem-solvers who aim to prove (or disprove) what they already know in advance: “The man who is striving to solve a problem defined by existing knowledge and technique is not just looking around. He knows what he wants to achieve, and he designs his instruments and directs his thoughts accordingly” (Kuhn, 1970). It is perhaps characteristic of the richness of the phenomenon—the conjunction of KM and innovation—that these original points are not as mutually exclusive as they may at first seem. Kuhn’s view recognises the inevitability of scientific revolution—“the tradition-shattering complements to the tradition-bound activity of normal science” (Kuhn, 1970) —through “paradigm shifts”, which occur when the developed solutions to existing problems show the theories to be incorrect or inadequate to explain the facts. Polanyi saw creativity as a more individual or internal activity, but recognised that the tacit knowledge of many individuals can be collected and combined to form a new model or theory (Polanyi, 1967). Some authorities therefore call this the “first generation” of KM.

A significant development to the discipline of KM occurred in the early 1990s (e.g. Nonaka, 1991) which developed some aspects of the work of Polanyi into a conversion process or cycle that, it was claimed, could be used to change tacit knowledge (i.e., peoples’ creative ideas and thoughts) into explicit knowledge, based on more readily accessible and usable organizational artefacts such as repositories and knowledge bases. This approach is typified by work by Probst which, building on systems theory, follows a process that starts with knowledge identification, followed by knowledge acquisition, knowledge development, knowledge distribution, usage of knowledge and knowledge retention in codified form (Probst et al. 1997). Such models were well accepted by software developers, who were quick to develop products such as knowledge bases and document management systems to exploit the growing interest. This has been termed second generation KM (Schütt, 2003). In discussing such models based on system thinking, Stacey (2001) comments, “This reflects an underlying way of thinking in which knowledge is reified, treated like a ‘thing’ that can be possessed, that corporations can own”. In his view, “knowledge itself cannot be stored, nor can intellectual capital be measured and certainly neither of them can be managed” (Stacey, 2001). His comments appear to apply to knowledge when it is regarded as a single commodity, rather like information. Subsequent approaches to KM seek to identify and explore the components that make up the phenomenon of knowledge and examine their role in putting knowledge into action in organizations.

The second generation of KM developed from the first through a movement that stressed the uses of knowledge in organizations, going beyond the mental processes of the individual knowledge worker and recognising the complexity of modern, knowledge-creating organizations. This may therefore be termed the organizational generation of KM. Nonaka and Takeuchi (1995) held that companies are more like living organisms than machines, and most of them viewed knowledge as a static input to the
corporate machine. Later work by Nonaka and Takeuchi (1995) appears to integrate Nonaka’s cyclic approach (known as SECI) with systems theory to provide a more systematised, a view that implied that knowledge could be moved from one form to another in a process rather like information systems design and development. Nonaka and Takeuchi therefore view knowledge as a renewable and changing resource and hold that knowledge workers are the agents for effecting that change. Knowledge-creating companies, they believe, should focus their KM activities primarily on the task of innovation rather than knowledge hoarding. Schütt observes that “Knowledge, in this sense, is not so much a thing or a higher (quality) level of information, but more a kind of capability to put data into context” (Schütt, 2003). Snowden separates knowledge into five components that are capable of being analysed and assessed, the first letters of which form the mnemonic ASHEN (Snowden 2000), which is intended for use in optimising knowledge management. The framework is based on artefacts, or useful information stored in the form of things that are documented (i.e., explicit knowledge assets in Nonaka’s view); skills or the ability of individuals and groups to acquire, manipulate and put to use high-level information in knowledge contexts; heuristics or the rules of thumb used by experts to manipulate information to make decisions in complex situations; experience or the cumulative ability of individuals and groups to apply skills and employ heuristics and to identify and develop artefacts to achieve beneficial results based on the use of knowledge in practice; natural talent or the innate ability of certain individuals (the most expert knowledge workers) to manipulate knowledge and to achieve desired results from its use.

This raises the issue of knowing not just what knowledge is codified or documented in an organization, but what knowledge should and could be codified or documented. It may be contended that second generation KM practices promoted the collection of knowledge resources without a clear need, the later approach implies that the organization needs to have a clear judgement of what knowledge is likely to be needed. An analogy can be drawn with production supply chain practices; to be cost effective, some knowledge provision has to follow just–in–time rules (acquisition upon need), and other provision has to be just-in-case (acquisition in advance of need). In this view explicit (i.e., existing, documented) knowledge resources follow usual organizational information management practices and might end up in a document or content management system on the organization’s intranet. The innovation in KM that is a part of this approach is the way the things are handled that cannot be codified. These tacit resources are linked to single experts or sometimes groups of experts, who interact with the KM system(s) in a number of ways. Communities of Practice (CoP) combine groups and individuals who have an interest to share knowledge about a relevant area of expertise (usually on a voluntary basis). Usually a CoP maintains a best practice database or a log of lessons learned. Physical conferences or virtual meetings and the use of web forums and blogs help in harvesting innovative ideas and sharing knowledge. Such technologies are not, of course, ephemeral, as they may continue to exist and find use as knowledge artefacts. Debriefing sessions or after action reviews (originating in a military context) identify and preserve the learnings from significant experiences (e.g., projects and innovations) and help to spread knowledge-based skills and develop heuristics and rules of thumb for later use by others. Teaching sessions by key knowledge owners can have a similar effect. Storytelling or narratives are used as an alternative (and perhaps more natural) way to identify and discuss critical knowledge and to disseminate it. These techniques (and others) can be used to prepare and promote interventions leading to cultural change (Snowden, 2001). This marks a significant departure from many of the precepts of the previous generation of KM and leads to an explicit connection between KM and organizational learning (OL). Senge (1990) originally identified OL as a sustainable source of competitive advantage in business, discussing holistic systems thinking as a fifth discipline of business. This can enable an organization to develop a superior capacity to learn, to retain, and to benefit from that learning through new ideas and new products and services that
competitors find difficult to imitate. By definition, this process is sustainable and can provide a renewable source of competitive advantage, placing the links between KM, OL, innovation, and competitive advantage at the very heart this generation of KM. Second generation KM may therefore be defined as a management discipline that focuses on organizational learning to encourage business innovation as a renewable source competitive advantage.

Third generation KM followed on naturally from this set of precepts and seeks to appreciate and understand what the effects of the process of managing knowledge can have on an organization and its workers. “In a complex domain we manage to recognise, disrupt, reinforce and seed the emergence of patterns; we allow the interaction of identities to create coherence and meaning” (Snowden, 2002). Third generation KM frameworks such as Snowden’s Cynefin model tend to recognise the conjoint complexity of organizations and knowledge, seeking to make sense of the relationship between them in complicated and complex work processes and organizational structures. In Snowden’s view, the third generation of KM will require the “clear separation of context, narrative and content management” and seeks to challenge the orthodoxy of scientific management on which the second generation of KM was based. Therefore, in the third generation of KM, complex adaptive systems theory is used to create a model that seeks to utilise the self-organising capabilities of informal communities and identifies a natural flow model of knowledge creation, disruption, and utilisation.

This implies a new and important role for the knowledge worker using new generation KM technologies and informal networking communities to acquire knowledge and promote innovation. To some extent, this marks an evolution of second generation KM rather than a revolution (some authors therefore do not recognise the existence of the later generation). Others term the third generation of KM the ecological generation, as it involves the interaction of knowledge workers, knowledge assets, and organizational and environmental factors interacting together as a complex adaptive system.

**KM, INNOVATION AND TECHNOLOGY**

Tapscott (2006) sees a clear link between the role of the knowledge worker and innovation in interacting with peers and with organizational KM resources, but believes that the nature of the interaction has become more advanced. He describes social media tools on the World Wide Web that can initiate and enable more powerful forms of collaboration than were possible in the second generation of KM. He points out that knowledge workers routinely engage in peer-to-peer knowledge sharing across organizational boundaries, forming networks of expertise in a more complex way than would be possible with traditional CoPs. They do this by using a variety of Web 2.0 social networking technology applied in an organizational context, calling them Enterprise 2.0 technologies. The key technologies in Enterprise 2.0 are wikis, social networking systems, blogs, search engines, mashups, portals, Web/videoconferences, bulletin boards, and discussion forums. Using this technology, enterprise social networking enables corporate knowledge workers to use a network that allows exchanges that can lead to new knowledge creation.

Enterprise 2.0 therefore appears to provide a collaborative platform that enables organizational and trans-organizational knowledge to be exchanged and consolidated. The connectivity of wikis, portals and forums makes the exchange of knowledge possible, and the use of search engines and content management systems makes the acquisition of knowledge (from inside and outside of the organization) more easily possible. Enterprise 2.0 therefore has the power to change the way an organization collects new knowledge and how it stores it, changing the way organizations approach Knowledge Management in
the third generation of KM. When compared to previous models of industrial competition (e.g. Porter 1985) that assume that organizations will seek to gain advantage from knowledge that competitors do not have and cannot access (except, of course, for strategic partnerships that are negotiated and conducted at a high level in the organization), there are concerns over copyright and intellectual property law being challenged in practice, inhibiting organizations’ KM practices. In fact, the approach may not be contrary to conventional models of industry competition, as Porter maintains that companies will change the basis of competition, seeking to gain whatever advantage they can (temporarily or permanently) from their knowledge relationships. In this view, businesses must collaborate in order to survive. There are instances of alliances of public (i.e. government) and private (i.e. commercial) concerns collaborating to develop innovations with no discernable competitive commercial outcome for any party, with the open-source Linux operating system and the Human Genome Project as oft-cited examples. These may be seen as examples of innovation for the long term public good although, needless to say, there are always likely to be opportunities for the commercial exploitation of developments arising from such fundamental innovations in technology and science.

Denning (2000) envisions two basic different approaches or mindsets relating to KM and innovation. The first of these he calls the Napoleonic or engineering approach (Dyson 1998), which refers to the application of scientific discovery to practical invention. It assumes the existence of a controllable path—a process based on a series of linked tasks—from the generation of the idea to its exploitation. In Denning’s terms, the approach represents an effort to reduce all knowledge to a set of mechanistic propositions which he attributes to “…a continuing itch for reductionist simplicity” (Denning 2000), which he feels can lead to attempts to micro-manage, to over-control, and to rely on unwarranted hierarchical organizations, procedures, and rules that may ultimately stifle the processes of creativity and innovation in a rapidly-changing environment. The opposite of this is what Denning sees as the Tolstoyan or ecological approach (Dyson, 1998), which is based on the creative chaos and freedom on which creativity apparently thrives and which seeks to exploit the connections between things and people that are features of the collaboration and social networking schools of KM. Both Denning (2000) and Dyson (1998) maintain that humans naturally grasp the natural connectedness of things and are able to exploit these connections in new and innovative ways without formal rules or controls. This process is said to be more rapid and more reliable than rigid mechanistic processes of management, which tend to rely on analytical (rather then creative) thinking. As organizational initiatives such as business process re-engineering and redesign appear to conform to this paradigm, it may be difficult for organizations to design their way out of this problem without a fundamental paradigm shift.

2009 - EUROPEAN YEAR OF CREATIVITY AND INNOVATION

The European Commission decided that Europe needed to boost its capacity for creativity and innovation for both social and economic reasons, so it declared 2009 as the European Year of Creativity and Innovation (EYCI 2009). In doing so, it recognised the need for better use of knowledge and more rapid innovation, and acknowledged that a new emphasis was needed to broaden the creative skills of whole populations. The initiative instils a need for managers and national leaders to embrace this change of paradigm as an opportunity and to prepare the way for a more culturally diverse, innovative society based on the creative use of knowledge. The initiative therefore aims to raise public awareness of the importance of creativity and innovation for generating economic development, in order to contribute to economic prosperity as well as to improve social and individual well-being. The activities of EYCI
2009 are aimed at a range of different social groups including educators, public and private sector policy
makers and the general public in a process that is called the knowledge triangle.

ORGANIZATION OF THE BOOK

The contributors to this book include academics, researchers, managers and practitioners in a variety of
areas relating to KM and innovation. They come from the USA and a number of countries in Europe and
Asia, giving a global coverage and interest to the book. Their contributions represent their individual
views on a number of different topics and, in some cases, different views of the same topic. This variety
of interest and experience produces a diverse and culturally rich view of the phenomena that make the
book a relevant and timely publication in the areas of KM and innovation. This very diversity, however,
makes it important to organize the book in a way that makes sense of the diversity and provides a logical
link between the various contributions.

Section 1 of the book therefore focuses on the phenomenon of the learning organization and the role
of KM in the OL process and in the first chapter, Bratianu examines, in a Romanian context, the role
of universities as knowledge-intensive learning organizations, observing that such bodies are knowledge-
intensive, since the density of knowledge and the dynamics of knowledge processing are more important
than other types of organizations. He notes the common assumption that since learning is one of the
major processes within universities, they are by definition learning organizations. Bratianu’s point is
that this assumption may be an error, and although a particular university may meet the accepted defini-
tion of knowledge intensive based on learning processes, it is not necessarily a learning organization.
The chapter performs a functional analysis of the specific knowledge processes before identifying the
necessary conditions for a generic university to become a learning organization. This is a useful prereq-
uisite to successful innovation in universities, academic institutes, or indeed any knowledge-intensive
organizations.

From South Africa, Smut, van der Merwe and Loock examine KM through an innovative learning
solution, linking the growth and earnings of knowledge-intense companies to their increasing efforts
to extract wealth from individual and organizational know-how as a replacement for plant, machinery
or other conventional factors of production, which the authors (following Becker) no longer see as
providing strong differentiation. In this view, the shift to a knowledge-oriented economy has favoured
organizations that can turn knowledge into new products and services faster than their competitors can
(Kanter, 1997). Also, an organization’s (and, by extension, a nation’s) knowledge is seen as a primary
source the source of its wealth. In this chapter the authors quote Porter, who regards the application of
knowledge to those tasks, products, and services that exist as productivity and to those that do not yet
exist as innovation. They observe that of all commodities, only knowledge can achieve these two ap-
parently conflicting objectives. This chapter provides an overview of the application of KM in a mobile
telecommunications company operating in 21 countries in Africa and the Middle East. The concept of
a corporate university is described, with specific reference to an innovative technology solution for one
of the learning components of this enterprise.

Berger and Beynon-Davies examine knowledge-based diffusion in practice through a case study.
The authors encourage the reader to consider how the use of particular development methods shapes
information systems (IS) practice and how organizations adapt and use knowledge in support of such
projects. They conceptualize an IS development method as a de-contextualized knowledge bundle, in
which relevant knowledge (e.g. experience of similar projects, or of the use of certain IS development methods) is diffused between organizations and infused within organizations through the processes of contextualization. The authors particularly consider the way in which the structure and culture of organizations affects the processes of diffusion and infusion. Their discussion is grounded in case-study material collected from an ethnographic study of a large-scale IS development project. In this project, an agile IS development method promoted by external vendors experienced initial problems in organizational deployment due to its poor acceptance in that particular context. Gradually, benefiting from developing experience and therefore increasing knowledge, the IS development method was adapted to its context and was finally used successfully by the project team. In this chapter the authors identify and consider the factors that allowed this transformation to occur, focusing on the role of knowledge in the process of IS innovation.

Chang and Li examine the factors that are important in fostering the deployment of KM in research and development (R&D) workspaces in Taiwan. Their discussion begins with a discussion of whether knowledge management (KM) is a new idea or just a recycled concept, and they comment on the number of claimed solutions to a variety of problems in the form of KM strategies, frameworks, processes, barriers and enablers, IT tools and measurements. The chapter points out that, although many KM studies exist in both public and private sectors, most of these studies focus on western experiences and relatively few cases are reported on KM deployment and implementation in the Asia-Pacific region. They especially make a case for studying knowledge-intensive R&D institutes whose missions are to serve traditional industries. To discuss some of the successes of KM deployment in this region, this chapter presents and discusses the lessons learned from a case study in fostering a KM initiative and system development in an R&D institute serving the metal industry, and it recommends a five-stage approach to KM deployment that may find applications in similar environments in other parts of the world.

Tung-Xiung indicates that there may be problems with continued innovation and the use of new technology through a series of comparative longitudinal case studies recorded over more than two decades in China. The research on which the chapter is based has monitored the evolution of technological innovation, its effect on human factors, and discusses some of the resulting syndromes, such as Computer Fear Syndrome (CFS) and User Alienation Syndrome (UAS). The research involves an interesting analysis of the empirical data derived from these case studies and concludes with a proposed Funnel Model that suggests appropriate courses of management action and puts forward new ideas for developing KM systems in a variety of organizations that may prevent such syndromes from occurring or alleviate their effects in typical organizations.

Orange and Ah-lian Kor present theoretical work that seeks to integrate various epistemologies from the philosophical, KM, cognitive science, and educational perspectives. Surveying the knowledge-related literature, the authors collate a number of apparently diverse views of knowledge and then categorise and ascribe attributes to the different types of knowledge in order to make them more useful in practice. They develop a new Organizational Information and Knowledge Management Model which seeks to clarify the distinctions between information and knowledge by introducing a novel conversion framework accompanied by a proposal for mechanisms that will improve individual knowledge creation and information sharing that will benefit Communities of Practice and organizations.

Finally, Shue addresses the issue of extracting knowledge from financial statements, which could become important sources for investigating achievements on the primary business activities of planning, financing, investing, and operating in a variety of corporate types. He maintains that better knowledge of planning activities could assist managers in focusing their efforts and identifying business opportunities and obstacles to strategy. Accurate knowledge of financial activities may assist a company in acquiring
and managing its financial resources. Knowledge of investment opportunities including land, buildings, equipment, legal rights, inventories, and all components necessary for the competitive operation of a company, while operational knowledge represents the execution of the business plan requires knowledge from a variety of sources. As a result, according to Shue, financial statements provide the main source of information for all parties who are interested in the performances of a company, including its managers, creditors, equity investors, and others. Although each of these parties may have different perspective in viewing financial statements, one major concern to all parties is the financial quality of an enterprise, which requires knowledge that the author says can be derived from a careful analysis of financial statements.

Section 2 of the book moves on to examine the role of KM in the process of envisioning, inventing, and developing new products and explores the role of innovation in that process.

From the same institution in Italy, De Maggio and Margherita carry out a critical analysis of “knowledge democracy” as the new mantra or buzz-word in product innovation leadership. The chapter begins by discussing this phenomenon, which identifies participation in KM, co-operation, and the co-creation of innovative value as the new paradigm of business. The authors show how this new paradigm has revolutionized the traditional process of invention, which was previously associated with a hierarchical dissemination of new ideas and competitive hoarding of knowledge assets. They contend that this competitive environment has been replaced by a collaboration economy (a.k.a. wikinomics) in which democracy governs the process of knowledge creation and its strategic application. The chapter introduces terms such as “peering” (i.e., eliminating management hierarchies in favor of meritocracies based on the quality of ideas and inventions), “openness” (i.e., participation and involvement of any stakeholder who has something to contribute), “free sharing” (e.g., sharing of intellectual property to facilitate participation and cross-fertilization), and “total action” (i.e., the increasing use of virtual and distributed resources). The authors show that leadership in product innovation does not rely on the innate internal qualities of organizations, but on the collaborative contribution of stakeholders, including customers, partners and co-developers, to many of the activities that make up the NPD lifecycle. This new approach can enable advantageous product customization, improving a number of the factors that can reduce the value of the NPD process (e.g., time to market, cost reduction, investment risk). The chapter examines the factors that are needed to promote such open collaboration, from the development of a new managerial mindset, the acquisition of new distinctive competences, the development of new organizational models, and the management of new collaborative technologies. Within this setting, the adoption of knowledge democracy often implies the introduction of new interactive NPD processes, probably in a period of turbulent change, which can present organizations with significant change management problems. This creates a need to identify new models of process integration and to develop new organizational forms that are able to exploit the potential of knowledge democracy in NPD. The authors’ proposed framework of processes and competencies offers the potential for organizations to meet these needs.

Magnier-Watanabe and Senoo explore how KM, as an enabler of change, using its capability to create knowledge is subject to internal and external forces that shape the KM processes and the ways that knowledge is used. The chapter is a qualitative analysis based on a case study of the first major roll-out of Smartcard technology in France. The resulting analysis shows how institutional pressures affected not only the KM process but also the resulting innovation. The external factors that can impinge on the process include government initiatives, legal authorities, and cultural expectations. While this example is from French society, but it may be implied that such coercive pressures on the credit card industry are global in nature. In the case study of the introduction of a credit card (viewed as the development of an
innovative financial product), existing credit card systems and solutions acted as what the authors call “mimetic pressures” (i.e., they promoted copying from existing successes) and professional networks and network externalities acted as normative pressures (i.e., they tended to encourage the formation or adoption of norms or standards). The authors suggest that by acknowledging these institutional pressures and viewing these forces from a systems perspective, organizations can achieve improved strategic alignment and can provide a sounder basis for differentiation in their market places and sustaining competitive advantage.

Section 3 of the book focuses on common application areas of KM and considerable arenas for innovation—healthcare and education. Contributions to his section of the book are less numerous than some of the other application areas (e.g. NPD or OL), but are nevertheless important due to the innovative nature of the sector and the public service that can be offered by innovations in this area.

Baskaran, Naguib, Guergachi, Bali, and Arochena, in a joint Canadian/UK study, observe that contemporary healthcare organizations, like organizations in business sectors, are constantly under pressure to develop new strategies for delivering better services and that KM has been successfully applied in a business environment. However, they argue that failure to apply proper KM principles has reduced the confidence of new adopters of KM. This chapter suggests how KM can be appropriately applied within an innovative healthcare project and offers a case study which describes attempts to improve attendance at breast screening clinics. The case study discusses the need for a balance between the technological and human aspects of KM, and assesses the success of the use of KM in this application. A survey was conducted of doctors and clinical staff that appears to provide proof that a balanced approach will definitely increase the success of such initiatives. The outcomes of this project can increase the confidence of future KM adopters in healthcare generally, provides useful guidelines for conducting balanced KM initiatives and highlights the importance of taking a focused approach KM development, allowing innovative uses of KM in healthcare.

Wickramasinghe also pursues the theme of KM innovations in healthcare, but from an Australian perspective. He identifies the contribution of ICT systems to the increasing amounts of data and information that many organizations have to manage. He points out that although these systems and technologies were implemented to enable superior decision-making, the result has often been a state of information overload, referred to as the productivity paradox. He goes on to discuss KM as a way of making sense of this chaos by applying strategies and techniques to apparently unrelated (and perhaps irrelevant) data and information in order to extract the necessary knowledge to aid decision making. He contends that it is the configuration of these technologies that is important to support the techniques of KM, discusses the process-oriented knowledge generation framework of Boyd, and recommends ways in which the role of technology can enable the design of a network-centric healthcare operation that is an innovative and important contribution to healthcare applications of KM.

Eardley and Uden from the UK examine the innovative convergence of two emerging social and technological trends: the evolution of educational processes and methods from a traditional didactic approach towards a new learner-based paradigm and the development of software systems that enable the democratic involvement of learners and computer-mediated collaboration between individuals and groups with a common interest in learning. Originally the main purpose of such Web 2.0 software was social networking and leisure, but the chapter identifies a number of instances of its use in practice for professional education purposes. The chapter then highlights some examples of professional learning communities in practice in UK educational institutions and concludes by discussing possible future trends in the use of social software for supporting professional learning communities.
Again, in the next chapter, Uden and Eardley examine a different aspect of education: Problem-based Learning (PBL). This chapter begins with a brief review of knowledge sharing, followed by the importance of knowledge sharing for learning, especially in problem-based learning. The authors draw on material demonstrating that knowledge is often the most important resource and asset of many organizations. They show that the exchange of knowledge and KM often enhances OL, which in turn leads to the potential for innovation in those organizations. The authors contend that knowledge sharing is central to the concept of knowledge management and that the future of knowledge sharing is not technical, but social. They then demonstrate how successful knowledge sharing can be achieved for students in a PBL environment. The chapter concludes by identifying the most important implications for effective knowledge sharing in PBL.

Vasilache, Dan, and Dima discuss the issue of innovation in the Romanian healthcare sector from the point of view of organizational learning (OL). They contend that the extent to which OL can promote innovation is influenced by the dominant organizational culture. Adopting the premise that hospital organizational culture in hospitals exhibits singular features when compared to other organizations, the authors of this chapter surveyed medical and nursing staff from a clinic within a large teaching and research hospital. A questionnaire developed by the authors was used to study the perceptions of the two sub-cultures (physicians and nurses) regarding the relationship between organizational culture and innovation. The results of their study confirm the differences in perception between physicians and nurses previously found in the literature and identify the factors which promote OL and innovation in a typical clinical environment, comparing these to the factors that correlate with them negatively. The recognition of cultural factors in this context and the resulting recommendations may be transferable to hospitals in other cultures.

Section 4 of the book includes some interesting submissions on the role of KM in the process of innovation and some examinations of how invention and innovation may be achieved by the use of knowledge. A similar theme to that addressed by Vasilache et al., but from a resource-based perspective, is pursued by Smith and Coakes, who discuss the instability of the business environment and observe that organizations must constantly strive to match or exceed the rate of this change in order to maintain or improve their competitive position. This change, they observe, must be managed effectively and consistently and factors such as organizational competence must be in place to allow the maintenance and development of innovative processes and products that meet business needs. To address the opportunities and threats presented by such complex and unpredictable environments, the authors show that organizations must combine and recombine their resources in novel and innovative ways, reconfiguring or eliminating obsolete resources and acquiring appropriate new resources. They show that innovation accompanied by repeated and rapid resource manipulation can achieve competitive advantages that are not easily imitated by rivals. This capability may be critical to an organization’s business performance, as it enables the development of new products and services that enable it to improve its competitive position. The authors explore the numerous theories of change in the literature, but observe that competitive advantage is increasingly located by authorities in an organization’s intellectual resources and its human capital. This includes the capability to innovate by mixing human skills with knowledge. In their view innovation is “characterized by an iterative process of people working together, sharing insights, and building on the creative ideas of one another”. This chapter emphasizes the role that an organization’s intellectual resources have in enabling superior innovation and change capabilities. Whereas Chang and Li recommend a process, Smith and Coakes conclude that an organization’s ability to use resources to foster close social interaction and open knowledge sharing in the workplace and to leverage its informal
leadership is a vital part of a related KM initiative. It is possible that both views are valid and that their conclusions and recommendations can complement one another.

Gaál, Szabó, Obermayer-Kovács, Kovács, and Csepregi offer an innovative approach to KM by suggesting a framework, based on KM profiling, for mapping KM practice in organizations. This approach involves an objective assessment process that can be used by knowledge-intensive organizations for gauging their current position with regard to KM activities and processes. The chapter shows that uncertainty can present a barrier to the introduction of suitable activities for improving KM processes in most organizations. The authors believe that the research can be offer significant practical advantages and will provide substantial support for leaders and managers in establishing KM. Moreover, the right KM activities can help to stimulate creative thinking and provide a spur to inventions and innovations. The authors show that to ensure success and the long-term benefits from effective applications of OL and KM practice is of critical importance to many organizations. Besides simply evaluating the benefits that are inherent in KM, the work indicates that organizations must learn to recognize and manage the different areas of their KM practices. The authors’ innovative solution, their Knowledge Management Profile, involves the formulation of a new KM maturity model that, it is suggested, may be of vital importance in improving KM practice.

The issue of recognizing innovation through social network analysis is addressed in Grippa and Elia through their case study of their Virtual eBMS (VeBMS) project at an Italian university. The authors contend that advances in communication technologies have enabled organizations to develop and operate decentralized organizational structures by supporting coordination among workers in different locations. Such developments have led to a lessening of the degree of formality in control structures and a replacement, to a certain extent, of formal channels of communication with less formal social networks. The authors offer the observation that managers need to match such changes with new processes and tools to continuously monitor the less-obvious social interchanges and relationships within and across their organizations to manage and assess the effectiveness of this innovative type of knowledge network. They describe the development and application of a ‘Social Network Scorecard’ (SNS) tool that can be used to monitor how an interdisciplinary and inter-organizational project team (made up of individuals from academia and industry) was able to collaborate on the implementation of a technological platform that allowed the integration of KM, e-Learning, e-Business, and project management disciplines in a higher education environment. The VeBMS platform consists of a collaborative working environment that supports a range of knowledge-sharing and learning processes within the University of Salento, Italy and was used as a ‘test bed’ to evaluate the validity of the scorecard in practice. The chapter describes how the SNS tool can help monitor the evolution of an organizational community, recognizing creative roles and initiatives and tracing the connections between such initiatives and innovative outcomes. Looking at trends at individual, team and (inter-)organizational levels, we identified the most innovative phases within the team’s life cycle, using network indicators like density and degree centrality. The SNS provided feedback on the effectiveness of the team working to create the integrated platform and helped discover the phases in which the team acted in a manner conducive to innovation. They recognized in the Virtual eBMS project team the typical structure of an innovative knowledge network where learning networks and innovation networks co-exist with a more sparse interest network.

Sharp, Eardley, and Shah observe that organizations face the problem of creating a KM strategy that takes account of the complexity of their knowledge issues while being able to communicate them clearly. This issue, called here the Knowledge Strategy Dilemma, is the main theme of this chapter, and the authors maintain that a solution to the dilemma is vital for KM to succeed in practice. They argue,
however, that the literature shows that the dilemma can be tackled, although the literature includes approaches that help address different parts of the dilemma, there is a lack of an overall or integrated solution. The authors suggest that the best approach to address it in a coherent way is by using a KM method called MaKE, which they have developed for this purpose. The MaKE method is presented and two of its most important principles (traceability and transparency) are explained. Also a set of visual tools that help implement these principles in practice are critically discussed along with some indications of feedback from industry. The authors conclude that these principles, when applied, are capable of some success, and that different forms of communication (including face-to-face meetings with visual aids) are vital in addressing the dilemma.

Uden and Naaranoja demonstrate that innovation and knowledge management can no longer be considered to be luxury items. Rather, they should be regarded as strategic necessities and an important source of competitiveness and economic development. As resources, say the authors, knowledge and innovation cannot be separated and knowledge management is essential to innovative organisations. This chapter relates innovation closely to knowledge management and discusses the importance of knowledge management in innovation for organisations. It describes how innovation can be achieved through knowledge management through the use of a case study involving a school renovation and building project in Finland. The case study shows how the process of knowledge creation and sharing was used in practice to help innovation through ‘vision building’.

Kamoshida shows that the aim of innovative management is to intentionally create a chaos edge and to foster the innovations that are created as a result. The term “chaos edge” is usually used in complexity studies, but Kamoshida observes that it is also highly applicable to management, where innovation results from creative competition. In this chapter, the management concept used to create such innovation is called “holonic management”. Holonic management requires the elements of cultivation, competition, evaluation, and support. According to Kamoshida, constructing a chaos edge in a holonic management system can foster an internal environment in which ideas are created within a framework of cooperative work. The author’s idea of “heretical management” takes the innovations that are created by a minor group within a corporation and allows them to grow without fear of failure. Kamoshida suggests that this is not just the most effective tool but is a sound method of knowledge management.

It is our belief that the twenty chapters in this book, from a wide range of authors, makes a significant contribution to the body of literature on the important topics of KM and innovation and their conjunction. The concept of knowledge management and the capture and use of knowledge in a variety of organizations are topics that have been explored in a number of recent publications. Much of this recent work is theoretical or generic in its approach and applies to the process of KM, rather than to its application. This book explores a specific aspect of knowledge management: the exploitation of knowledge in support of innovation and change. It is hoped that this book will help to create and inform useful thought and debate in this important area of knowledge.

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REFERENCES


