Preface

Many companies and organizations find themselves in dynamic and even turbulent environments. Differentiation and customers' specific needs drive their markets, technologies change quickly and often disruptively, and professionals look for sense and personal growth in their work environment. Thus, organizations are required to learn continuously and to reinvent their processes and products. In these processes, employees' individual skills and their ability to share and generate knowledge within their communities and social networks increasingly play a crucial role.

Efficiently sharing expertise is critically important in many areas:

· Enabling organizational learning (e.g., Argyris and Schön 1996), where organizations and subunits can modify their structure and culture according to their experiences

· Augmenting new forms of organizations made possible by information technology (e.g., virtual organizations—Davidow and Malone 1992; Mowshowitz 1997), which often depend on knowing and judging people's competencies

· Creating ad hoc teams to solve time-critical problems

· Providing better technical assistance and presales marketing, and maintaining customer relationships over time

· Developing social capital (Putnam 2000; Cohen and Prusak 2001), including factors such as trust, reciprocity, and shared norms and values in knowledge-sharing processes

Knowledge management examines how organizations can effectively manage, store, retrieve, and augment their intellectual properties. The

term *knowledge management* points to an important issue in organizations today—corporations and nonprofit organizations are increasingly dependent on deploying nontangible assets, such as know-how and tactical problem solving, in shorter time frames.

In our opinion, most approaches offering computer support for knowledge management show a rather narrow understanding. In general, there are two views of supporting knowledge management through software. The first exploits the idea of externalizing knowledge and recommends placing more and more information into shared repositories. These information databases or organizational memories have the advantage of using standard computational techniques and offer the hope of easily reusable information. These traditional approaches tend to focus on gathering, providing, and filtering available explicit knowledge.

However, the repository view of knowledge management has some important limitations and cannot be used in all situations. The information in a repository is easily transferable and reusable, but decontextualized information is often not easy to use. Users often need to find either knowledgeable people or people who can help them apply the information to the current situation or problem. Similarly, when the knowledge is tacit, access to people is often indispensable. If there is a complex or innovative problem to be solved, access to experts is often preferred over static documents.

Recently, research and practice has moved to the second type of knowledge management, which we call expertise sharing. Many researchers (e.g., Argyris and Schön 1996; Nonaka 1991) have pointed the way toward this type of knowledge management. The human resources and organizational behavior fields have for years hinted at the importance of personnel in organizational life. Ackerman (1993) argued for the importance of augmenting what he called expertise networks. Bannon and Kuutti (1996) proposed considering the active, constructive aspect of remembering in work activities as an invaluable resource in organizations.

Expertise sharing, then, focuses on the human components—the cognitive, social, cultural, and organizational aspects of knowledge work—in addition to information storage and retrieval. Compared to traditional approaches, which emphasize the role of management in organizing

knowledge exchange, our perspective focuses on self-organized activities of the organizations' members. In enabling sharing, organizations try to connect people to one another so as to bolster communication, learning, and organizational knowledge. A variety of technical and social experiments are under way in organizations, and this book examines those efforts. As well, expertise management includes communities of practice and knowledge communities, which attempt to augment and increase communities', professions', and groups' overall expertise.

We believe it is important to further establish and cultivate this second type of knowledge management (expertise sharing). This viewpoint is reflected throughout this book.

Personal Views

Our views of the importance of expertise in knowledge management spring largely from our own research experiences.

Ackerman's work began with a system, Answer Garden, to foster organizational memories, storehouses of commonly required information and activities within organizations (Ackerman 1993; 1998; Ackerman and Malone 1990). This conception of organizational memory included information repositories as well as access to people through the system: if you could not find an answer, the system would route a question to an appropriate human expert. (The expert could then place the question and answer in an information repository, growing it. Thus the system's name.) Research on Answer Garden's use showed the utility of, and the issues in, finding people who knew the answers to organizational problems. Further work (Ackerman and McDonald 1996; Ackerman and Palen 1996) explored these ideas, adding "graceful escalation" through various computer-mediated communication facilities like chat and bulletin boards, to the basic system. In fact, many strands of work (Ackerman and Starr 1996; McDonald and Ackerman 2000) explored how to better tie together what was called the expertise network (Ackerman 1993) of an organization or larger collectivity—how to find people who know things, how to bring people together in ad hoc teams, and how to find the results of those activities. Throughout all this work, the importance of connecting and transforming the social network was key. Managing

knowledge could not be about static repositories; information in social settings lives and breathes, and is intimately tied to the social fabric. Sharing and managing expertise has always been a necessary part of knowledge management.

Pipek started working at the research group Human-Computer Interaction and CSCW at the University of Bonn, Germany, after obtaining his master's degree in computer science. He first focused on the organizational dynamics of groupware introduction processes (Pipek and Wulf 1999; Mambrey and Pipek 1999). Sensitized through these experiences to the importance of good knowledge logistics as well as to the power of self-organization, he then focused on systems to support collaboration (discourse-based design) in communities (Pipek et al. 2000; Märker and Pipek 2000). He now leads a project on organizational learning in virtual organizations, which focuses on developing expertise sharing in networks of distributed autonomous actors. The basic motivation for his activities (including his interest in electronic democracy) is the combination of the communication and computing powers of information technology to support self-organization in knowledge-intensive environments.

Wulf worked with groupware design for and with users. POLITeam was a major research project to develop collaborative technologies that supported work in the German political administration. In this effort two facts became clear. First, the design and introduction of groupware is strongly interrelated with processes of organizational development. Second, most of the knowledge relevant to enable these development processes could not be found in the official documentation (organizational charts or task descriptions) but resided in the heads and practice of the workers (Wulf 1997; Wulf 1999; Pipek and Wulf 1999). Based on this experience, Wulf developed the concept of integrated organization and technology develoment (OTD). It became the base for several research projects carried out at the University of Bonn's ProSEC Research Group and the International Institute for Socio-Informatics (Wulf and Rohde 1995; Wulf et al. 1999; Rohde, Rittenbruch, and Wulf 2001). While encouraging organizational learning through process innovations, support for knowledge and expertise sharing became an important research issue.

The Book's Perspective

This book addresses both researchers and practitioners in the knowledge management area. Researchers will find a state-of-the-art book on expertise sharing, detailing the literature and current research frontier. Practitioners will find the critical issues and important perspectives they need to implement viable systems. We have made every effort to make the book readable for all audiences. We believe the review articles will be of lasting value and the technical and empirical chapters helpful for understanding expertise sharing.

We have consciously exposed the complexity and difficulty of sharing expertise. There already are many management books that prescribe how to manage what people know. The six-step process for better utilizing the intellectual capital of a business is close at hand, and the twelve-step process for repairing the damage is not far away. However, while straightforward prescriptive processes are easy to understand and sell, they tell a limited story. Tying together people in new ways is hard work—it is at the frontier of our understanding of management practices, social networks, and technical augmentations. One should not expect simple solutions.

We cannot hope to definitively define the term *expertise* here. A vigorous academic debate is raging around the term. For our purposes, however, *expertise* connotes relative levels of knowledge in people. Relatively few people will claim themselves to be experts, but many people agree they have some measure of expertise in some area. The chapters in this book consider how to inculcate, share, and find expertise so that the resources of an organization (and the people within it) increase.

The book's title uses the term *sharing* instead of *managing* to distinguish our way of thinking from some other approaches in knowledge management, particularly from those researchers strictly examining knowledge sharing from a traditional management perspective. Instead, this book examines a range of possibilities—from traditional management structures to how expertise might be self-organized by knowledge workers. In many views, management may be better able to facilitate than to prescribe or control information activities.

Accordingly, this book views expertise management from alternative and critical stances. By critical, we mean a critical realism stance, viewing current theories and efforts through an empirical lens based in field studies of real organizations. We find this new area of research and its possibilities exciting, but we also wish to avoid both management science and Tayloristic reductions. Instead, the book focuses on the possibilities without losing the complexity and difficulty of the enterprise. The book has been heavily influenced by the computer-supported cooperative work (CSCW) and the alternative information technology (IT) communities.

Structure of the Book

The book has three parts:

• *Part I: Literature review and background chapters.* This part introduces the general topic through surveys of the state of the discussion in the literature and the practice of knowledge sharing in large organizations.

• *Part II: Field/use studies.* This part looks empirically into the actual practice of expertise sharing in different types of organizational settings. It should provide the reader with an understanding of the inherent complexity of expertise sharing. Because expertise is socially arranged and organized, it must be understood through studies of real organizations. We include a number of field studies examining expertise management both as it is currently practiced and how it may be practiced with computational augmentation.

• *Part III: System studies.* This part looks at tools that have the potential to facilitate expertise sharing. A variety of computational systems can be used to route queries, assemble people and work, and augment the naturally occurring social networks inside an organization. We examine technical mechanisms and architectures designed specifically for expertise management, primarily focusing on interesting prototype applications. Some of them have already been evaluated in practice, others still wait for such a proof of concept. The contributions that form this part are based in two distinct research communities: artificial intelligence (AI) and computer-supported cooperative work (CSCW), which we be-

lieve contribute to the pool of technological innovations in this emerging field.

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