A GUIDE TO MANAGING KNOWLEDGE

Cultivating Communities of Practice

Etienne Wenger
Richard McDermott
William M. Snyder

HARVARD BUSINESS SCHOOL PRESS
Boston, Massachusetts

Printed in the United States of America
06 05 04 03 5 4

Library of Congress Cataloging-in-Publication Data
Wenger, Etienne, 1952-
Cultivating communities of practice : a guide to managing knowledge / Etienne Wenger, Richard McDermott, William Snyder.
p. cm.
Includes bibliographical references and index.
ISBN 1-57851-330-8
1. Knowledge management. 2. Organizational learning. I. McDermott, Richard A. (Richard Arnold) II. Snyder, William, 1956- III. Title.

HD30.2 .W46 2002
658.4'038—dc21

2001051483

The paper used in this publication meets the requirements of the American National Standard for Permanence of Paper for Publications and Documents in Libraries and Archives Z39.48-1992.

from Etienne, to his wife, Paula
from Richard, to his dad, F. Arnold McDermott
from Bill, to his parents, Pat and Monte

CHAPTER one

Communities of Practice and Their Value to Organizations

In 1988, when Japanese competition was threatening to put the Chrysler Corporation out of business, no one suspected that the resurgence of the company (now the Chrysler unit of DaimlerChrysler) would depend in part on the creation of an innovative knowledge system based on communities of practice. While some of its competitors took as little as three years to get a new vehicle to market, a typical new-product development cycle at Chrysler easily ran five years. This was no way to compete. The first order of the day was to achieve a dramatic reduction in this product-development cycle.

The story is well known, though the role that communities of practice played is less widely understood. At the time, Chrysler was a traditional organization typical of large manufacturing operations, with functional units such as design, engineering, manufacturing, and sales. The design department would send a new design to engineering, which would send it back for redesign a few times. The design would then go to manufacturing

and be returned for reengineering until the vehicle was deemed "manufacturable." The localized focus of the various functional units limited interaction between departments and thus gave rise to these unavoidable iterations. Repeated hand-offs, duplication, and therefore slowness, were built into the system.

The decision was made to radically reorganize the unit. Engineers would now belong to "car platforms." These platforms were product-oriented, cross-functional structures that focused on a type of vehicle: large cars, small cars, minivans, trucks, and Jeeps. Each platform was responsible for all phases of development associated with the whole vehicle. Engineers of all specialties reported to supervisors within the platform on which they worked. As a result, their primary focus was on the development of a specific vehicle. For instance, if you were a brakes engineer, your main allegiance, your reporting relationships, and your performance evaluation were no longer with the brakes department, but with a platform, such as small cars or minivans.

Eventually, the move to car platforms succeeded in reducing the product-development cycle from five to two and a half years, with a corresponding cut in research and development costs. But the restructuring did not come without its own costs. A host of new problems started to appear: multiple versions of the same part with slight variations, uncoordinated relationships with suppliers, innovations that did not travel, and repeated mistakes. The company had gained the advantage of product focus, but compromised its ability to learn from its own experiences. Something had to be done to save the platform idea.

With a clear need for communication across platforms, former colleagues from functional areas started to meet informally. Managers recognized the value of these informal meetings in fostering learning processes that cut across all platforms. Still, they wanted to keep the primary allegiance and formal reporting relationships of engineers within the platforms. Rather than formalizing these emerging knowledge-based groups into a new matrix structure, they decided to keep them somewhat informal but to sanction and support them. The Tech Clubs were born.

Tech Clubs began to take more active responsibility for their areas of expertise. For instance, they started to conduct design reviews for their members before a design went through quality gates. In 1996, an engineering manager revived the old idea of creating an Engineering Book of Knowledge (EBoK), a database that would capture the relevant knowledge that engineers needed to do their job, including compliance standards, best practices, lessons learned, and supplier specifications. The EBoK vision could succeed only if the engineers themselves took responsibility for creating and maintaining the content. Some Tech Club leaders saw the project as an opportunity for consolidating Tech Club knowledge and taking stewardship of it. Documenting engineering knowledge had been tried several times before, but now it was part of the activities and identity of specific communities in charge of designated areas of engineering. This communal responsibility for producing the EBoK was key to its success.

Over time, Tech Clubs progressively established their value and they have become an integral part of engineering life at the Chrysler division. Engineers have discovered that participation helps them do their jobs better, and the time spent together is a good investment. It often saves them time later and increases their confidence in their own designs. It gives them a chance to get help with specific problems, to learn what others are discovering, and to explore new technologies. Today, there are more than one hundred officially recognized Tech Clubs, plus a few emerging ones. They are responsible for a host of knowledge-based activities such as documenting lessons learned, standardizing practices for their area, initiating newcomers, providing advice to car platforms, and exploring emerging technologies with suppliers. Through the Tech Clubs, Chrysler realized the value of what today people call "communities of practice." Theirs is among the pioneering stories, but it is no longer unique. It reflects a movement spreading all over the world.

Companies at the forefront of the knowledge economy are succeeding on the basis of communities of practice, whatever they call them. The World Bank delivers on its vision of fighting poverty with knowledge as well as money by relying on communities of practice that include employees, clients, and external partners. Shell Oil relies on communities of practice to preserve technical excellence across its multiple business units, geographical regions, and project teams. McKinsey & Company counts on its communities of practice to maintain its world-class expertise in topics

important to clients who are themselves becoming smarter and more demanding. The list could go on and on. In all industries, companies are discovering that communities of practice are critical to mastering increasingly difficult knowledge challenges. They are learning to recognize and cultivate these communities. Moreover, once these communities find a legitimate place in the organization, they offer new possibilities—many yet undiscovered—for weaving the organization around knowledge, connecting people, solving problems, and creating business opportunities. And because communities of practice are not confined by institutional affiliation, their potential value extends beyond the boundaries of any single organization.

What Is a Community of Practice?

COMMUNITIES OF PRACTICE are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis. Engineers who design a certain kind of electronic circuit called phase-lock loops find it useful to compare designs regularly and to discuss the intricacies of their esoteric specialty. Soccer moms and dads take advantage of game times to share tips and insights about the subtle art of parenting. Artists congregate in cafés and studios to debate the merits of a new style or technique. Gang members learn to survive on the street and deal with an unfriendly world. Frontline managers running manufacturing operations get a chance to commiserate, to learn about upcoming technologies, and to foresee shifts in the winds of power.

These people don't necessarily work together every day, but they meet because they find value in their interactions. As they spend time together, they typically share information, insight, and advice. They help each other solve problems. They discuss their situations, their aspirations, and their needs. They ponder common issues, explore ideas, and

act as sounding boards. They may create tools, standards, generic designs, manuals, and other documents—or they may simply develop a tacit understanding that they share. However they accumulate knowledge, they become informally bound by the value that they find in learning together. This value is not merely instrumental for their work. It also accrues in the personal satisfaction of knowing colleagues who understand each other's perspectives and of belonging to an interesting group of people. Over time, they develop a unique perspective on their topic as well as a body of common knowledge, practices, and approaches. They also develop personal relationships and established ways of interacting. They may even develop a common sense of identity. They become a community of practice.

Communities of practice are not a new idea. They were our first knowledge-based social structures, back when we lived in caves and gathered around the fire to discuss strategies for cornering prey, the shape of arrowheads, or which roots were edible. In ancient Rome, "corporations" of metalworkers, potters, masons, and other craftsmen had both a social aspect (members worshipped common deities and celebrated holidays together) and a business function (training apprentices and spreading innovations).[1] In the Middle Ages, guilds fulfilled similar roles for artisans throughout Europe. Guilds lost their influence during the Industrial Revolution, but communities of practice have continued to proliferate to this day in every aspect of human life.[2] Every organization and industry has its own history of practice-based communities, whether formally recognized or not. Why else are the surviving U.S. automakers all based in Detroit? What explains the high-tech fertility of Silicon Valley? And why can't you buy a world-class flute outside of three small manufacturers based in Boston?[3]

Communities of practice are everywhere. We all belong to a number of them—at work, at school, at home, in our hobbies. Some have a name, some don't. Some we recognize, some remain largely invisible. We are core members of some and occasional participants in others. Whatever form our participation takes, most of us are familiar with the experience of belonging to a community of practice.

A Key to Success in a Global Knowledge Economy

IF COMMUNITIES OF PRACTICE have been so pervasive for so long, why should organizations suddenly focus on them? It is not communities of practice themselves that are new, but the need for organizations to become more intentional and systematic about "managing" knowledge, and therefore to give these age-old structures a new, central role in the business.

Knowledge has become the key to success. It is simply too valuable a resource to be left to chance. Companies need to understand precisely what knowledge will give them a competitive advantage. They then need to keep this knowledge on the cutting edge, deploy it, leverage it in operations, and spread it across the organization.[4] Cultivating communities of practice in strategic areas is a practical way to manage knowledge as an asset, just as systematically as companies manage other critical assets. Indeed, the explosion in science and technology creates a difficult paradox. At the same time that the increasing complexity of knowledge requires greater specialization and collaboration, the half-life of knowledge is getting shorter. Without communities focused on critical areas, it is difficult to keep up with the rapid pace of change.

These changes are happening at a time when firms are restructuring many relationships internally and externally to respond to the demands of a shifting market. Internally, companies are disaggregating into smaller units focused on well-defined market opportunities, as illustrated by the DaimlerChrysler Tech Club story. Externally, they increasingly partner with other organizations in the context of their extended enterprise. Both types of relationships spread production and delivery of value over many distinct entities.[5] Communities of practice connect people from different organizations as well as across independent business units. In the process, they knit the whole system together around core knowledge requirements.

The knowledge economy presents an additional challenge. Knowledge markets are globalizing rapidly.[6] What someone knows in Turkey could make or break your business in London. What a competitor's team is learning in South America could be the undoing of your project in Massachusetts. Consider the example of the Siemens sales team in Malaysia that was able to get a large telecommunication contract because of the experience and material developed by their peers in Denmark. Success in global markets depends on communities sharing knowledge across the globe.

Besides contributing to the success of organizations in world markets, these communities have another benefit. In the globalizing knowledge economy, companies are not just competing for market share. They are also competing for talent—for people with the expertise and capabilities to generate and implement innovative ideas. One company found that employees belonging to world-class communities of practice exploring cutting-edge issues were much more likely to stick around.[7] Finding and keeping the right people can make a big difference in a company's ability to become a market leader and to gain access to venture capital. In some industries, recruiting, developing, and retaining talent is a greater challenge than competing in commercial markets.

All these trends of the knowledge economy point to the critical role that communities of practice are destined to play. Indeed, knowledge-driven markets make it imperative to develop a "knowledge strategy" along with a business strategy. Yet many organizations have no explicit, consolidated knowledge strategy. Rather, it exists implicitly at best, dispersed in strategic plans, human resource reports, or system-improvement proposals. A knowledge strategy details in operational terms how to develop and apply the capabilities required to execute the business strategy. Therefore, a knowledge strategy eventually depends on communities of practice. Amoco and the U.S. Navy, for example, each established a process for developing such a knowledge strategy. The process starts with strategic goals and required core competencies, business processes, and key activities. It analyzes these in terms of critical knowledge "domains." Finally, it identifies the people who need this knowledge for their work and explores how to connect them into communities of practice so that together they can "steward" this knowledge.[8]

The Nature of Knowledge: A Managerial Challenge

ALTHOUGH EXECUTIVES RECOGNIZE the value of knowledge and the need to develop an intentional knowledge strategy, exactly how to do that is less clear. Recently, new information technologies have inspired dreams of capturing all the knowledge of an organization into databases that would make it easily accessible to all employees. Early attempts at knowledge management, however, were beholden to their origin in information technology (IT) departments. They tended to confuse knowledge and information. Building the system alone devoured resources, but it turned out to be even more difficult to motivate people to use these early knowledge bases. Companies that had invested their entire knowledge strategies in such information systems sooner or later found out that they had created digital junkyards. For instance, one consulting firm audited its knowledge systems and found it had 1,100 databases. Only thirty of them were active, and of these, at least twenty were actually news feeds. Companies discovered the hard way that useful knowledge is not a "thing" that can be managed like other assets, as a self-contained entity. Nor does it just float free in cyberspace. If companies are going to compete on knowledge, and manage and design structures and technology for it, they need to base their strategy on an understanding of what the knowledge challenge is. The essence of this challenge comes down to a few key points about the nature of knowing.

Knowledge Lives in the Human Act of Knowing

If a friend told you that he had read many books about surgery and was ready to operate on your skull, you would be right to decline politely. When surgeons operate on a patient, they do not blindly apply knowledge they have gleaned from books or procedures they have stored in their heads. They consider the patient's medical history, monitor vital signs, look at tissues, make incisions, draw conclusions, and possibly revise the plan to make sure that the procedure is constantly responsive

to the evolving situation. Engaging their expertise in this way is an active, inventive process that is just as critical as their store of knowledge itself.[9]

To develop such expertise, practitioners need opportunities to engage with others who face similar situations. Neurosurgeons, for instance, will travel long distances to operate with a colleague in order to refine their technique.[10] The knowledge of experts is an accumulation of experience—a kind of "residue" of their actions, thinking, and conversations—that remains a dynamic part of their ongoing experience.[11] This type of knowledge is much more a living process than a static body of information. Communities of practice do not reduce knowledge to an object. They make it an integral part of their activities and interactions, and they serve as a living repository for that knowledge.

Knowledge Is Tacit As Well As Explicit

We are all aware that "we know more than we can tell."[12] Not everything we know can be codified as documents or tools. From a business standpoint, the tacit aspects of knowledge are often the most valuable.[13] They consist of embodied expertise—a deep understanding of complex, interdependent systems that enables dynamic responses to context-specific problems. This type of knowledge is very difficult for competitors to replicate.[14]

Sharing tacit knowledge requires interaction and informal learning processes such as storytelling, conversation, coaching, and apprenticeship of the kind that communities of practice provide.[15] This is not to say that it is not useful to document knowledge in whatever manner serves the needs of practitioners. But even explicit knowledge is dependent on tacit knowledge to be applied.[16] Companies have found that the most used, and useful, knowledge bases were integrated into the work of one or more communities. The success of Daimler-Chrysler's EBoK is largely due to the fact that the Tech Clubs are in charge of the process and view it as part of what their community is about. Communities of practice are in the best position to codify knowledge, because they can combine its tacit and explicit aspects.[17]

They can produce useful documentation, tools, and procedures because they understand the needs of practitioners. Moreover, these products have increased in meaning because they are not just objects by themselves, but are part of the life of the community.

Knowledge Is Social As Well As Individual

You know that the earth is round and orbits the sun, but you did not create that knowledge yourself. It derives from centuries of understanding and practice developed by long-standing communities. Though our experience of knowing is individual, knowledge is not. What counts as scientific knowledge, for instance, is the prerogative of scientific communities, which interact to define what facts matter and what theories are valid. There may be disagreements, there may be mavericks, but it is through a process of communal involvement, including all the controversies, that a body of knowledge is developed. It is by participating in these communities—even when going against the mainstream—that members produce scientific knowledge.[18]

Appreciating the collective nature of knowledge is especially important in an age when almost every field changes too much, too fast for individuals to master.[19] Today's complex problem solving requires multiple perspectives. The days of Leonardo da Vinci are over. We need others to complement and develop our own expertise. This collective character of knowledge does not mean that individuals don't count. In fact, the best communities welcome strong personalities and encourage disagreements and debates. Controversy is part of what makes a community vital, effective, and productive.

Knowledge Is Dynamic

Knowledge is not static. It is continually in motion. In fact, our collective knowledge of any field is changing at an accelerating rate. What was true yesterday must be adapted to accommodate new factors, new data, new inventions, and new problems.[20] This dynamism does not mean that a domain of knowledge lacks a stable core. In all fields, there

is a required baseline of knowledge. One of the primary tasks of a community of practice is to establish this common baseline and standardize what is well understood so that people can focus their creative energies on the more advanced issues. Meeting this baseline is essential even to be in the game; you must be on the leading edge to hold a competitive advantage. That is why knowledge, even explicit knowledge, must be constantly updated by people who understand the issues and appreciate the evolution of their field. But to keep up with the ever-advancing amount and rate of change of knowledge, these people must work as a community. In one community, for instance, members list the relevant conferences for a given year and each attends one, then reports back to the others. Such interaction helps members manage information overload, get knowledgeable feedback on new ideas, and keep abreast of leading thoughts, techniques, and tools.

In short, what makes managing knowledge a challenge is that it is not an object that can be stored, owned, and moved around like a piece of equipment or a document. It resides in the skills, understanding, and relationships of its members as well as in the tools, documents, and processes that embody aspects of this knowledge.[21] Companies must manage their knowledge in ways that do not merely reduce it to an object.

Social Structures As a Management Tool

What managers have been missing so far is an understanding of the kind of social structure that can take responsibility for fostering learning, developing competencies, and managing knowledge.[22] Managers have discovered specific structures for other purposes. For instance, in the last three decades many firms were able to move to customer-focused, project-based organizations because they had discovered teams—the ideal social structure to which managers can assign project responsibility.

But what about the ownership of knowledge? Conventional structures do not address knowledge-related problems as effectively as they do problems of performance and accountability. Even though a lot of learning happens in business units and teams, it is easily lost. Business

units focus on immediate opportunities in the market in order to achieve their business goals, so learning usually takes the back seat. Project teams are temporary, so their knowledge is largely lost when they disband. Ongoing operational teams are focused on their own tasks, so their knowledge often remains local. Traditional knowledge-oriented structures such as corporate universities and centers of excellence have usually been located in headquarters, separated from the line employees who would put the knowledge to use.[23] Many companies are discovering that communities of practice are the ideal social structure for "stewarding" knowledge. By assigning responsibility to the practitioners themselves to generate and share the knowledge they need, these communities provide a social forum that supports the living nature of knowledge.

Cultivating Communities of Practice

COMMUNITIES OF PRACTICE are a natural part of organizational life. They will develop on their own and many will flourish, whether or not the organization recognizes them. Their health depends primarily on the voluntary engagement of their members and on the emergence of internal leadership. Moreover, their ability to steward knowledge as a living process depends on some measure of informality and autonomy. Once designated as the keepers of expertise, communities should not be second-guessed or overmanaged.[24] These observations may lead some to argue that there is nothing one can do to cultivate communities of practice, or worse, that anything organizations do will merely get in the way. We disagree. In fact, this book is born of our experience that organizations need to cultivate communities of practice actively and systematically, for their benefit as well as the benefit of the members and communities themselves.

Cultivation is an apt analogy. A plant does its own growing, whether its seed was carefully planted or blown into place by the wind. You cannot pull the stem, leaves, or petals to make a plant grow faster or taller.

However, you can do much to encourage healthy plants: till the soil, ensure they have enough nutrients, supply water, secure the right amount of sun exposure, and protect them from pests and weeds.There are also a few things we know not to do, like pulling up a plant to check if it has good roots.

Similarly, some communities of practice grow spontaneously while others may require careful seeding. Yet in both cases, organizations can do a lot to create an environment in which they can prosper: valuing the learning they do, making time and other resources available for their work, encouraging participation, and removing barriers. Creating such a context also entails integrating communities in the organization—giving them a voice in decisions and legitimacy in influencing operating units, and developing internal processes for managing the value they create.

If organizations fail to take active steps in this direction, communities of practice will still exist, but they are unlikely to achieve their full potential. They will tend to organize along friendship lines or within local geographical or organizational contexts rather than cover the whole organization. Some communities may not develop at all, either because people do not know about each other or because they do not have the time and energy to devote to community development. It is also difficult to channel resources (both time and financial) in the absence of active engagement with the organization. Without intentional cultivation, the communities that do develop will depend on the spare time of members, and participation is more likely to be spotty, especially when resources are lean. As a result, communities are apt to have less impact. They may not be fully aligned with the organization and therefore fail to contribute all they could. Just as important, the organization may not be well aligned with them, and therefore fail to recognize and leverage their contributions.

Still, there is some truth to the claim that there is nothing that organizations can or should do. You cannot cultivate communities of practice in the same way you develop traditional organizational structures. Design and development are more about eliciting and fostering participation than planning, directing, and organizing their activities.

The process has to be one of negotiation. You cannot act unilaterally. With a team of employees you can choose the goal, because you hired them to meet that goal. But with a community, your power is always mediated by the community's own pursuit of its interest. You cannot violate the natural developmental processes and dynamics that make a community function as a source of knowledge and arbiter of expertise, including members' passion about the topic, the sense of spirit and identity of the community, and its definition of what constitutes expert performance. Rather, you must learn to understand and work with these processes and dynamics. Cultivating communities of practice in an organizational context is an art, and the following chapters offer a guide to the subtleties of this art.

Creating Multiple Types of Value

ORGANIZATIONS that have taken steps to cultivate communities of practice have found that these communities are unique among organizational structures in their ability to deal with a broad variety of knowledge-related issues. For instance, they can

- connect local pockets of expertise and isolated professionals,
- diagnose and address recurring business problems whose root causes cross team boundaries,
- analyze the knowledge-related sources of uneven performance across units performing similar tasks and work to bring everyone up to the highest standard, and
- link and coordinate unconnected activities and initiatives addressing a similar knowledge domain.

Appreciating the value communities of practice create depends on setting the right expectations. Communities of practice are not a universal silver bullet. They are not meant to replace teams or business units as structures for serving markets and delivering products and services. But when their role in stewarding knowledge is well understood, they

will be recognized as one of the primary contributors to success in the knowledge economy. Communities of practice do not merely manage knowledge assets. They create value in multiple and complex ways, both for their members and for the organization.

Short-Term and Long-Term Value. Participating in a community of practice has both short-term and long-term value, as summarized in table 1-1. In the near term, members can get help with immediate problems. They spend less time hunting for information or solutions. By including the perspectives of their peers, they devise better solutions and make better decisions.[25] They can be more daring in taking risks or trying new things, knowing they have a community to back them up. They can coordinate efforts and find synergies across organizational boundaries. As they address current problems, meanwhile, communities are also building sustained value by developing an ongoing practice that will serve the organization's long-term strategy. Members develop professionally; they keep abreast of new developments in their field and benchmark their expertise against that of colleagues in other organizations. This confluence of short-term and long-term value creation is well illustrated by DaimlerChrysler's Tech Clubs. They help each other solve immediate problems, but they also accumulate their experience in a knowledge base. They constantly discuss upcoming technologies with suppliers and prepare the organization to respond to these developments.

Tangible and Intangible Value. The value communities create includes tangible results such as a standards manual, improved skills, or reduced costs through faster access to information. It also includes less tangible outcomes such as a sense of trust or an increased ability to innovate. Tying community activities to tangible business outcomes is important lest business leaders make the mistake of dismissing communities as "soft" structures. Articulating the value of communities in terms of their tangible effects on performance provides them with the legitimacy they need to steward knowledge effectively. But it is still important to remember that some of their greatest value lies in intangible outcomes, such as the relationships they build among people, the sense of belonging they create, the spirit of inquiry they generate, and the professional confidence and identity they confer to their members.[26]

TABLE 1-1 SHORT- AND LONG-TERM VALUE TO ORGANIZATIONS AND COMMUNITY MEMBERS

Note: In each entry, examples of value are listed from more tangible to less tangible.

	SHORT-TERM VALUE	LONG-TERM VALUE
	IMPROVE BUSINESS OUTCOMES	**DEVELOP ORGANIZATIONAL CAPABILITIES**
Benefits to Organization	• Arena for problem solving • Quick answers to questions • Reduced time and costs • Improved quality of decisions • More perspectives on problems • Coordination, standardization, and synergies across units • Resources for implementing strategies • Strengthened quality assurance • Ability to take risks with backing of the community	• Ability to execute a strategic plan • Authority with clients • Increased retention of talent • Capacity for knowledge-development projects • Forum for "benchmarking" against rest of industry • Knowledge-based alliances • Emergence of unplanned capabilities • Capacity to develop new strategic options • Ability to foresee technological developments • Ability to take advantage of emerging market opportunities
	IMPROVE EXPERIENCE OF WORK	**FOSTER PROFESSIONAL DEVELOPMENT**
Benefits to Community Members	• Help with challenges • Access to expertise • Better able to contribute to team • Confidence in one's approach to problems • Fun of being with colleagues • More meaningful participation • Sense of belonging	• Forum for expanding skills and expertise • Network for keeping abreast of a field • Enhanced professional reputation • Increased marketability and employability • Strong sense of professional identity

Strategy-Implementing and Strategy-Making Value. Communities of practice provide value through their abilities to develop new strategies as well as implement existing ones. On the one hand, communities of practice are a way to realize a business strategy. Implementing strategy most often depends on the participation of highly competent frontline practitioners who understand the products, are aware of market trends, and know what it will take to beat the competition. At Procter & Gamble, for example, communities are a key component of the strategy to apply technological innovation across product lines. The process design community leverages the strategic value of deploying process innovations across various product lines by translating ideas and techniques across manufacturing operations. On the other hand, communities of practice can contribute to the formulation of new strategies. McKinsey is known as a premier strategy-consulting firm, and yet it relies largely on its communities of practice to drive the evolution of its own strategy. For example, a dramatic expansion in its retail-finance consulting was triggered when, in the late 1980s, a small group led by five to seven consultants started meeting at Chicago's O'Hare Airport to pool their knowledge about consumer marketing and financial institutions. Soon they had developed several effective approaches for clients, and over the next few years the practice grew to include hundreds of consultants serving clients in the United States and Europe in a fast-growing market niche. When highly developed, influential communities of practice keep abreast of market opportunities as well as their own practice development, they can inform or enact new strategic initiatives.

Connecting Professional Development and Corporate Strategy

Most important, communities of practice create value by connecting the personal development and professional identities of practitioners to the strategy of the organization. Successful ones deliver value to their members as well as to the organization. If it is not clear how members benefit directly from participation, the community will not thrive, because the members will not invest themselves in it. Similarly, if the community's value to the organization as a whole is not understood, it is

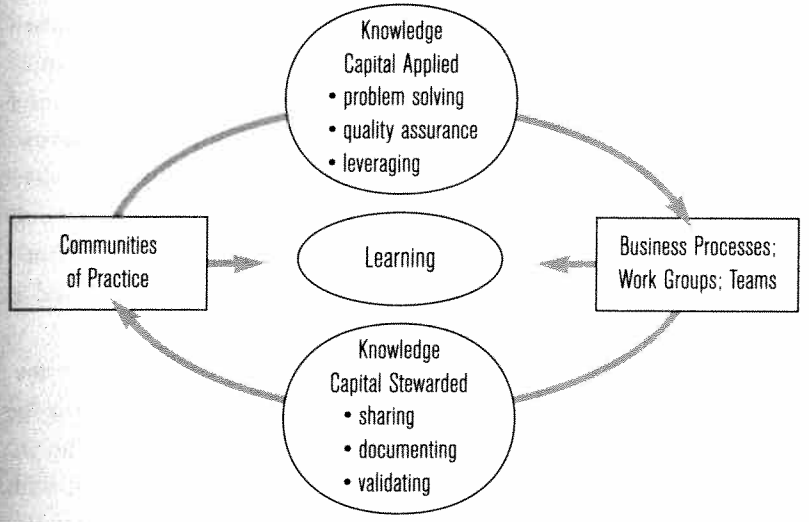
difficult to justify investing resources in the community and to legitimize its voice. The ability to combine the needs of organizations and community members is crucial in the knowledge economy, where companies succeed by fully engaging the creativity of their employees. The multiple and complex ways in which communities of practice deliver value to both members and organizations is the reason they are fast becoming a central part of the management agenda.

Ushering in the "Double-Knit" Knowledge Organization

FOR AN ORGANIZATION to learn from its own experience and to fully leverage its knowledge, the communities that steward knowledge and the business processes where knowledge is applied must be tightly interwoven—creating what we call a "double-knit" organization.[27] Practitioners themselves, in their dual roles as both community practitioners and operational team members, help link the capabilities of communities of practice to the knowledge requirements of teams and business units.

In this regard, a community of practice is very different from a center of excellence where specialists develop knowledge without being involved in line operations. At DaimlerChrysler, for instance, engineers wear two hats. Their main affiliation with their car platform focuses on working with other engineers to optimize the design of a model; as Tech Club members, they keep up with their specialty, coordinate standards, and share knowledge and lessons learned. This *multimembership* creates a learning loop, as illustrated in figure 1-1. As members of teams and workgroups, people are accountable for performing tasks. When they face familiar problems, they apply and refine their skills; when they encounter new problems, they invent new solutions. But the same people are also community members, and as such they are accountable for developing a practice. They bring their team experience to their communities and receive help with their problems. They can discuss

FIGURE 1-1 **THE MULTIMEMBERSHIP LEARNING CYCLE**



their new solutions, generalize or document them, and integrate them into the community's practice. Then they return to their projects equipped with expanded capabilities, which again face the test of application to real problems. Through this multimembership the learning cycle continues indefinitely. That is why it is so important to have communities of actual active practitioners manage their own knowledge.

This double-knit structure of teams and communities is reminiscent of "matrix" organizations, in which people have multiple reporting relationships to serve different purposes. For instance, you might have a boss in your business unit and another in your functional or geographic area. In fact, a knowledge-management guru once asked us whether this was not "matrix management done on the cheap." We had to respond that this was in fact the original idea behind matrix management *done right*. Actually, communities of practice provide a fundamentally different approach toward the same goal. The matrix structure only focuses on the distribution of authority and the coordination of resources by multiplying reporting relationships. It does not create

different structures for different purposes. Whereas a matrix has reporting relationships on both arms, communities of practice provide a different kind of structure for focusing on knowledge. They are based on collegial relationships, not reporting relationships. Even community leaders are not your bosses; they are your peers. This combination of formal and informal structures is fundamentally different from a matrix. It provides new degrees of freedom for designing organizations. Managers can design formal structures to focus on accountability for customer and business results, while relying more heavily on informal structures such as communities of practice to address issues related to knowledge, competence, and innovation.[28]

Relying explicitly on communities of practice fundamentally transforms the landscape of the organization. Domains of knowledge become focal points for connecting people in different units who are working on potentially related projects. The power associated with these knowledge domains becomes a more visible part of the organization. In fact, in a fast-moving knowledge economy, these domains are often more stable and enduring than specific projects, jobs, products, or even businesses. Business units are constantly being reorganized. Projects come and go. Teams are assembled and dispersed. Given such flux in the formal organization, communities of practice offer an underlying layer of stability. They provide a welcome "home for identity" where practitioners can connect across organizational and geographic boundaries and focus on professional development rather than merely the application of expertise to meet a specific goal.[29]

As one engineer reported, "You are redeployed so often, the only source of stability is your community of practice. It is great to have them. These are people you know you will be with the rest of your career." In an organization that is constantly changing, employees may not know who their boss is going to be tomorrow, which country they will be sent to, or which team they will join. But they know that they will still belong to their community of colleagues.

The focus on communities of practice thus points the way to a new wave of organizations where the formal structures—those organized around providing products and services—are constantly changing to meet shifting market needs, while the informal, voluntary structures—those organized around knowledge—are more stable. Indeed, one could argue that with the stability provided by communities of practice, organizations can be even more flexible in response to shifting market demands. As a consequence, leading knowledge organizations are increasingly likely to view communities of practice not merely as useful auxiliary structures, but as foundational structures on which to build the organization.

businesses and consumers—and organize citizens with common interests in areas such as housing, parenting, health, education, the arts, and other areas of practice associated with human society.

Hence, what we are learning in businesses about organizing for learning and knowledge has important implications for the evolution of markets and for the challenges and opportunities associated with governance in society and the world.[20] Because community-organizing methods emphasize voluntary initiative and are organized around practices rather than boundaries that are defined by place or ownership structures, they are particularly relevant to market- and society-based applications. Business organizations are a good learning laboratory for several reasons. They have the motivation and the resources to move up the learning curve quickly. They are becoming a catalyst for civic communities of practice that help attract and develop a highly skilled workforce. And what people learn at work will influence their approach to civic life: Their experience of work-related communities of practice will help them take leadership in creating similar structures in other parts of their lives.

Firms that understand how to translate the power of communities into successful knowledge organizations will be the architects of tomorrow—not only because they will be more successful in the marketplace, but also because they will serve as a learning laboratory for exploring how to design the world as a learning system.

Notes

Chapter 1

1. In fact, the term *community of practice* was coined in the context of studies of traditional apprenticeship. Apprenticeship is often thought of as a relationship between a master and a student. Yet we observed that learning took place mostly during interactions with journeymen and more advanced apprentices. *Community of practice* is the term we used to refer to this social structure. Once we had the concept, however, we started to see these communities in many other settings, where there was no official institution of apprenticeship. See J. Lave and E. Wenger, *Situated Learning: Legitimate Peripheral Participation* (New York: Cambridge University Press, 1991).

2. In 1902, in his preface to the second edition of *The Division of Labor in Society* (New York: Free Press, 1964), sociologist Emile Durkheim traced the history of professional groups from ancient times through the twentieth century. Durkheim argued that occupational communities could provide the social connections that were needed to strengthen the fabric of societal trust and mutual commitment—even as the forces of industrialization and attendant social disruptions threatened to tear apart the historical ties that bound people together in ancestral towns and villages.

3. Scott Cook and Dvora Yanow describe this cluster of flute-making companies located in Boston. "Culture and Organizational Learning," *Journal of Management Inquiry* 2, no. 4 (1993): 373–390. More generally, Michael Porter showed that various types of industries, including shipbuilding, advertising, and household furniture, tend to cluster within a particular geographic region. "Clusters and the New Economics of Competition," *Harvard Business Review*, November–December 1998, 77–90. J. C. Spender found that industries themselves make up a kind of knowledge-based cluster

that includes companies sharing a common "industry recipe." *Industry Recipes: An Enquiry into the Nature and Sources of Managerial Judgement* (Oxford: Blackwell, 1989). A number of scholars have documented the ways in which Silicon Valley operates as an industry cluster with a concentration of technical and management skills related to high technology. See A. Saxenian, *Regional Advantage: Culture and Competition in Silicon Valley and Route 128* (Cambridge, MA: Harvard University Press, 1996); S. S. Cohen and G. Fields, "Social Capital and Capital Gains in Silicon Valley," *California Management Review* 41, no. 2 (1999): 108–130; and J. S. Brown and P. Duguid, *The Social Life of Information* (Boston: Harvard Business School Press, 2000), 161–172.

4. Over the last decade it has become widely accepted that an organization's capacity to learn, innovate, and leverage knowledge-based capabilities are critical to achieving market success. Since Peter Senge's *The Fifth Discipline: The Art and Practice of the Learning Organization* (New York: Currency/Doubleday, 1990) created a broader audience for the seminal work of Chris Argyris and Donald Schön, *Organizational Learning: A Theory of Action Perspective* (Reading, MA: Addison-Wesley, 1978), and for works by others on organizational learning, a slew of books have, in recent years, addressed the topics of learning and knowledge. Some of these books include: J. L. Badaracco, *The Knowledge Link: How Firms Compete through Strategic Alliances* (Boston: Harvard Business School Press, 1991); J. B. Quinn, *Intelligent Enterprise: A Knowledge and Service Based Paradigm for Industry* (New York: Free Press, 1992); P. F. Drucker, *Post-Capitalist Society* (New York: HarperBusiness, 1993); G. Hamel and C. K. Prahalad, *Competing for the Future* (Boston: Harvard Business School Press, 1994); D. Leonard-Barton, *Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation* (Boston: Harvard Business School Press, 1995); I. Nonaka and H. Takeuchi, *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation* (New York: Oxford University Press, 1995); T. A. Stewart, *Intellectual Capital: The New Wealth of Organizations* (New York: Doubleday, 1997); T. H. Davenport and L. Prusak, *Working Knowledge: How Organizations Manage What They Know* (Boston: Harvard Business School Press, 1998); and D. A. Garvin, *Learning in Action: A Guide to Putting the Learning Organization to Work* (Boston: Harvard Business School Press, 2000).

5. Quinn, *Intelligent Enterprise*, and T. J. Peters, *Liberation Management: Necessary Disorganization for the Nanosecond Nineties* (New York: Knopf, 1992), describe the trends toward both disaggregation and extended networks, which are themselves driven by the imperative to compete on the basis of knowledge assets.

6. J. L. Badaracco argues that "globalization of knowledge" is the driving force behind the changes taking place in the modern corporation as it engages in joint ventures, alliances, and networks that connect firms around the world. See *The Knowledge Link*, 9.

7. Professional relationships and social ties are important reasons why people stay with a company. See P. Cappelli, "A Market-Driven Approach to Retaining Talent," *Harvard Business Review*, January–February 2000, 103–111, and G. Dessler, "How to Earn Your Employees' Commitment," *Academy of Management Executive* 13, no. 2 (1999): 58–67. Don Cohen and Larry Prusak argue that companies can "win the war for talent" by offering employees an opportunity to build a sense of community with workplace colleagues. *In Good Company: How Social Capital Makes Organizations Work* (Boston: Harvard Business School Press, 2001), 19. Moreover, employees have good reason to stay when their companies can offer attractive opportunities to participate in robust communities. Research undertaken at Bell Labs found that its star performers were those scientists who were members of strong networks. See R. E. Kelley and J. Caplan, "How Bell Labs Creates Star Performers," *Harvard Business Review*, July–August 1993, 128–139.

8. A number of observers have emphasized the importance of developing a "knowledge strategy" that is linked to the overall business strategy. See M. H. Zack, "Developing a Knowledge Strategy," *California Management Review* 41, no. 3 (1999): 125–145; N. Foote and B. Manville, "Strategy as If Knowledge Mattered," *Fast Company*, April 1996, 66–67; and M. T. Hansen, N. Nohria, and T. Tierney, "What's Your Strategy for Managing Knowledge?" *Harvard Business Review*, March–April 1999, 106–116. Such strategies have historically been referred to in the academic literature as "resource-based" strategies. See Nonaka and Takeuchi, *The Knowledge-Creating Company*, 46–49, and J. B. Barney, "Looking Inside for Competitive Advantage," *Academy of Management Executive* 9, no. 4 (1995): 49–61. For examples of communities that steward strategic capabilities, see J. S. Brown and E. S. Gray, "The People Are the Company," *Fast Company*, November 1995, 78–82, and J. Storck and P. A. Hill, "Knowledge Diffusion through 'Strategic Communities,'" *Sloan Management Review* 41, no. 2 (2000): 63–74. An important benefit of strategic communities is their ability to help the firm both inform and implement strategic visions, thus closing the perennial gap between strategy development and execution.

9. In his studies of professional practice, and architects in particular, Donald Schön talks about having a "conversation with the situation." This conversation is framed by the experience of the professional, but is always an interactive, improvisational, and reflective engagement with a problem. See *The Reflective Practitioner: How Professionals Think in Action* (New York: Basic Books, 1983), 76–104.

10. Peter Drucker describes surgeons as classic "knowledge workers" who must be responsible for building learning and innovation into their work, and who rely on colleagues for assessing effectiveness in their practice. "Knowledge-Worker Productivity: The Biggest Challenge," *California Management Review* 41, no. 2 (1999): 86. Cohen and Prusak describe the problems that occur when a doctor has no colleagues with whom he can confer to keep current in the field. They recount the story of FDR's doctor who, in his dedication to his one famous patient, lost contact with other patients and colleagues and ironically thus "may have failed to learn things that might have extended the president's life." *In Good Company*, 7.

11. See R. McDermott, "Why Information Technology Inspired, but Cannot Deliver Knowledge Management," *California Management Review* 41, no. 3 (1999): 103–117.

12. M. Polyani, *The Tacit Dimension* (New York: Anchor Doubleday, 1966). Nonaka and Takeuchi describe the nature of tacit knowledge in a broader treatment of epistemology that includes both Eastern and Western perspectives. *The Knowledge-Creating Company*, 20–55.

13. Nonaka and Takeuchi (*The Knowledge-Creating Company*) and D. Leonard and S. Sensiper ("The Role of Tacit Knowledge in Group Innovation," *California Management Review* 40, no. 3 [1998]: 112–132) argue that tacit knowledge is a critical source

of innovation. Executives at Chapparal Steel were never worried about competitors learning to replicate their distinctive methods while visiting their operations, because they claimed that in a visit one only sees the visible, and it is the invisible that really matters. See D. Leonard-Barton, "The Factory as a Learning Laboratory," *Sloan Management Review* 34, no. 1 (1992): 23–38. Tacit knowledge is not only about expert skill, but also about the "care why" that motivates practitioners to create and to achieve excellence in their work. J. B. Quinn, P. Anderson, and S. Finkelstein, "Managing Professional Intellect: Making the Most of the Best," *Harvard Business Review*, March–April 1996, 72. On the nature of knowledge more generally, C. W. Churchman provides an extraordinary historical review of Western epistemology and suggests implications for "the design of inquiring systems" in organizations and society. *The Design of Inquiring Systems: Basic Concepts of Systems and Organization* (New York: Basic Books, 1971).

14. See Schön, *The Reflective Practitioner*, for examples of the highly tacit nature of individual professional expertise in areas such as architecture, psychotherapy, engineering, and town planning. R. Nelson and S. Winter describe a type of tacit knowledge that is embedded in "routines" at the organizational level which no one person can understand completely. *An Evolutionary Theory of Economic Change* (Cambridge, MA: Harvard University Press, 1982), 96–136.

15. W. M. Snyder, "Organization Learning and Performance: An Exploration of the Linkages between Organization Learning, Knowledge, and Performance" (Ph.D. diss., University of Southern California, 1996), 37–43.

16. Law is a good illustration of the dance of the tacit and the explicit. Our societies have found it very useful to articulate our social norms into laws, but we also have judges and legal experts who interpret these laws. What makes laws effective is what literary theorist Stanley Fish calls the "community of interpretation" that gives them meaning in practice. You can never fully articulate how this community gives meaning to laws. In fact, the more you articulate, through briefs and precedents, the more you need a community to make sense of the new documents. You need both: the laws and the community. The explicit and the tacit always need each other to be effective. See S. Fish, *Doing What Comes Naturally: Change, Rhetoric and the Practice of Theory in Literary and Legal Studies* (Durham, NC: Duke University Press, 1989).

17. Practice is a tangled combination of tacit and explicit dimensions. The challenge of managing their interplay has been described as a "generative dance between organizational knowledge and organizational knowing" (S. D. N. Cook and J. S. Brown, "Bridging Epistemologies: The Generative Dance between Organizational Knowledge and Organizational Knowing," *Organizational Science* 10, no. 4 [1999]: 381–400) and as a "balancing act between process and practice" (J. S. Brown and P. Duguid, "Balancing Act: How to Capture Knowledge without Killing It," *Harvard Business Review*, May–June 2000, 73–80). E. Wenger refers to this interplay in his discussion of the duality of the community processes of "reification" and "participation." *Communities of Practice: Learning, Meaning, and Identity* (New York: Cambridge University Press, 1998), 51–71.

18. Bruno Latour emphasizes the importance of having colleagues with whom to debate facts and interpretations in order to establish a scientific domain. He argues that the "first principle" of technology and science (or "technoscience") is that "the construction of facts and machines is a *collective* [Latour's italics] process." He describes the existential dilemma of a technoscience practitioner who finds himself without colleagues: "What happens to the inside of a specialty made up of only one person? This is the question that makes Joao so despondent: the inside disappears as well. Since he has no one to discuss the draft of his articles with, no one to try out the links he makes between various parts of chip architecture, no one to whom he can submit his proposals for trials of strength, no one to debug his prototypes, Joao ends up not *knowing* what is real and what is fictional in MOS technology." See *Science in Action: How to Follow Scientists and Engineers through Society* (Cambridge, MA: Harvard University Press, 1987), 29, 152.

19. For a further discussion of the collective and individual character of knowing and learning, see Wenger, *Communities of Practice*, 86–102, 134–148.

20. Badaracco offers evidence of how quickly the stocks of knowledge are growing and changing. For example, he cites studies by bibliometry and scientometry scholars who have found that the growth rates of scientific journals, books, and papers has been doubling in quantity every fifteen years for the past two centuries—a kind of Moore's Law of exponential growth in scientific insight. He explains that knowledge is becoming more specialized as it grows—there were fifty-four scientific specialties listed in the National Register of Scientific and Technical Personnel after World War II, and twenty years later there were 900. *The Knowledge Link*, 24–25. Recently, a Merrill Lynch study found that 50 percent of employee skills will become outdated within three to five years. M. Moe and H. Blodgett, "The Knowledge Web," Global Securities Research & Economics Group, Global Fundamental Equity Research Department, 2000.

21. J. P. Walsh and G. R. Ungson's review of organizational memory describes the variety of ways in which knowledge can be stored or embedded in organizations. See "Organizational Memory," *Academy of Management Review* 16, no. 1 (1991): 57–91. See also R. D. Pea, "Practices of Distributed Intelligence and Designs for Education," in *Distributed Cognitions: Psychological and Educational Considerations*, ed. G. Salomon (New York: Cambridge University Press, 1993), 47–87, on the ways knowledge is distributed in the context of practice and social relationships.

22. Peter Senge indicated that researchers as well as managers have been discovering new ways to organize for learning and managing knowledge. He was asked in a recent interview what he had learned in the last ten years about "the challenge of bringing the idea of the learning organization into reality." Senge responded, "We're finding again and again that the guiding principle is that significant innovations must be diffused through informal, self-organizing networks, through horizontal communities of practice. How you strengthen these communities is the key to how you disseminate innovation and maintain the innovators." R. Zemke, "Why Organizations Still Aren't Learning," *Training* (September 1999): 49.

23. Centers of excellence serving highly distributed practitioners are sometimes organized according to a community-like model in which a group of working practitioners—in conjunction with full-time staff—takes the initiative to steward their practice. See K. Moore and J. Birkinshaw, "Managing Knowledge in Global Service Firms: Centers of Excellence," *Academy of Management Executive* 12, no. 4 (1998): 83–86, 92.

24. Many observers have noted the challenge of managing communities of practice: "indeed, managing [them] can kill them" (T. A. Stewart, *Intellectual Capital: The New Wealth of Organizations* [New York: Doubleday, 1977], 97); or "virtually everyone who has studied them agrees that communities of practice cannot be created out of the blue by management fiat . . ." (D. Stamps, "Communities of Practice: Learning Is Social. Training Is Irrelevant?" *Training* 34, no. 2 [1997]: 39); or "communities of practice evolve, they are not created" (J. Liedtka, "Linking Competitive Advantage with Communities of Practice," *Journal of Management Inquiry* 8, no. 1 [1999]: 7).

25. D. G. Hoopes and S. Postrel found, for example, that software developers were less likely to produce "glitches" and more likely to finish projects on time when they could leverage a base of shared knowledge and cooperative relationships with colleagues. "Shared Knowledge, 'Glitches,' and Product Development Performance," *Strategic Management Journal* 20, no. 9 (1999): 837–865. Robin Teigland found that Internet consultants and programming "techies" increased their creativity and ability to solve difficult problems when they participated in both intra-firm and external (Internet-based) communities of practice. "Communities of Practice in an Internet Firm—Netovation versus On-Time Performance," in *Knowledge and Communities: Resources for the Knowledge-Based Economy*, ed. E. Lesser, M. Fontaine, and J. Slusher (Boston: Butterworth-Heinemann, 2000), 151–178.

26. A number of scholars have noted that communities of practice foster both human capital (individual skills and professional identity) and social capital (social networks that give rise to trust, reciprocity, and shared understanding). Cohen and Prusak, *In Good Company*, and J. Nahapiet and S. Ghoshal, "Social Capital, Intellectual Capital, and the Organizational Advantage," *Academy of Management Review* 23, no. 2 (1998): 242–266. For articles that focus on value to members for their own professional development or access to expertise, see M. C. Higgins and K. E. Kram, "Reconceptualizing Mentoring at Work: A Developmental Network Perspective," *Academy of Management Review* 26, no. 2 (2001): 264–288; D. Krackhardt and J. R. Hanson, "Informal Networks: The Company behind the Chart," *Harvard Business Review*, July–August 1993, 104–111; and E. Fink and L. B. Resnick, "Developing Principals as Instructional Leaders," *Phi Delta Kappan* 82, no. 8 (2001): 598–606. For articles that show how the professional peer-to-peer relationships that are characteristic of communities of practice can contribute to the success of intrafirm and interfirm networks and alliances, see W. Tsai and S. Ghoshal, "Social Capital and Value Creation: The Role of Intra-firm Networks," *Academy of Management Journal* 41, no. 4 (1998): 464–476; W. W. Powell, W. W. Koput, and L. Smith-Doerr, "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning in Biotechnology," *Administrative Science Quarterly* 41, no. 1 (1996): 116–145; and J. P. Liebeskind et al., "Social Networks, Learning, and Flexibility: Sourcing Scientific Knowledge in New Biotechnology Firms," *Organizational Science* 7, no. 4 (1996): 428–443.

27. R. McDermott describes the connection between teams and communities as a "double-knit" structure. "Learning across Teams: How to Build Communities of Practice in Team Organizations," *Knowledge Management Review* 8 (May–June 1999): 32–38. Nonaka and Takeuchi describe the relationship between business units, project teams, and knowledge structures as a "hypertext organization" because project teams and formal units draw on the knowledge structures on an as-needed basis as if clicking on hypertext to access information through a URL. *The Knowledge-Creating Company*, 160–196.

28. Various types of informal structures, of course, have always existed in organizations. There has been considerable research since the early years of management theory on the interdependence of formal and informal phenomena in organizations, including the pioneering research on work groups by F. J. Roethlisberger and W. J. Dickson (*Management and the Worker: An Account of a Research Program Conducted by the Western Electric Company, Hawthorne Works, Chicago* [Cambridge, MA: Harvard University Press, 1939]), and C. I. Barnard's reflections on "informal organizations and their relation to formal organizations" (*The Functions of the Executive* [Cambridge, MA: Harvard University Press, 1968]), 114–123. Since the 1950s, there has been a steady stream of research on how to integrate "human factors" in formal organizations—manifested in studies related to group dynamics (J. R. Hackman, "Group Influences on Individuals," in *Handbook of Industrial and Organizational Psychology*, ed. M. D. Dunnett [Chicago: Rand McNally, 1976], 1455–1518); sociotechnical systems (W. A. Pasmore, *Designing Effective Organizations: The Sociotechnical Systems Perspective* [New York: Wiley, 1988]); organizational culture (E. H. Schein, *Organizational Culture and Leadership* [San Francisco: Jossey-Bass, 1992]); "informal networks" (D. Krackhardt and J. Hanson, "Informal Networks: The Company behind the Chart"); and "self-organizing systems" (M. J. Wheatley, *Leadership and the New Science: Discovering Order in a Chaotic World* [San Francisco: Berrett-Koehler, 1994]). Recently, scholars have become more explicit about the role of personal networks in organization design. J. H. Gittell and L. M. Weiss, "Linking Intra- and Inter-organizational Networks through Organization Design: The Case of Patient Care Coordination," working paper 97-064, Harvard Business School, Boston, 2001. For a review of perspectives on the "informal organization," see also R. W. Scott, *Organizations: Rational, Natural, and Open Systems* (Englewood Cliffs, NJ: Prentice Hall, 1992).

29. Thomas Malone and Robert Laubacher argue that an increasing amount of work is done by independent freelancers who have no organizational home. "The Dawn of the e-Lance Economy," *Harvard Business Review*, September–October 1998, 144–152. They predict that these independent practitioners are likely to organize into independent "guilds" for several reasons, including socialization, professional development, and reducing health care costs and financial risks. R. Laubacher and T. W. Malone, "Retreat of the Firm and the Rise of Guilds: The Employment Relationship in an Age of Virtual Business," Twenty-First Century Initiative working paper 033, MIT Sloan School of Management, Cambridge, MA, 2000.

Chapter 2

1. Companies have used many terms to describe groups that correspond to our understanding of communities of practice, including "tech clubs," "learning networks," "thematic groups," "knowledge communities," "competency networks," "practices," "interest groups," and "knowledge centers," among others. Researchers have also used a variety of