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Chapter 14

MANAGING HUMAN RESOURCES FOR KNOWLEDGE-BASED COMPETITION: NEW RESEARCH DIRECTIONS

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MANAGING HUMAN RESOURCES FOR KNOWLEDGE-BASED COMPETITION: NEW RESEARCH DIRECTIONS

Modern organizations face constantly changing external environments. Thriving or merely surviving in such environments requires that organizations develop substantial management capabilities, one of which is effective knowledge management. Effective knowledge management requires, in turn, adopting and/or developing a human resource management (HRM) system that enhances the organization's ability to gain and utilize knowledge. This volume is intended to increase discussion and stimulate future research on how to effectively manage knowledge resources within organizations. The preceding chapters provide various perspectives about what is presently known about managing knowledge resources, and suggest current and future research needs to increase the competitive abilities that organizations need in the new environment. Our objectives for this chapter are to provide an integrative framework that shows the interrelationships among the key concepts discussed in this volume, and to suggest additional directions for future research.

In developing this volume, an underlying assumption of the editors was that the behavioral imperatives within an organization reflect the nature of an organization's competitive landscape and its specific strategy. Changes in the basic contours of the competitive landscape among businesses mean that some of our existing knowledge about human resource management is becoming obsolete and requires updating. Research that adequately addressed the needs of organizations facing the competitive conditions of the past does not adequately address many issues that organizations currently face. Among these issues is the need for effective knowledge management (see DeNisi, Hitt, & Jackson, Chapter 1).

The preceding chapters have described many aspects of human resource management systems that influence an organization's knowledge management capability—including the design and structure of work (Deeds, Chapter 2; Fiol, Chapter 3; Mohrman, Chapter 4, Oldham, Chapter 9), staffing (Pulakos, Dorsey & Borman, Chapter 6; Davis-Blake & Hui, Chapter 7; Maurer, Lee, & Mitchell, Chapter 11), training and development (Noe, Colquitt, Simmering & Alvarez, Chapter 8); rewards (Lawler, Chapter 10), organizational culture and climate (Tetrick & DaSilva, Chapter 12) and measurement practices (Boudreau, Chapter 13). Through a combination of these practices, organizations can develop new HR architectures to ensure that they have the human capital needed to achieve their strategic objectives (Lepak & Snell, Chapter 5).

In the strategic HRM literature, several models have been proposed to explain the means through which human resource management systems contribute to a firm's competitive advantage (e.g., see Arthur, 1994; Becker & Huselid, 1998; Jackson & Schuler, 1995). One such model is referred to as the behavioral perspective (Schuler & Jackson, 1987). According to the behavioral perspective, human resource management practices are an organization's primary means for energizing and directing employee behaviors. Employee behaviors, in turn, are presumed to be among the factors that ultimately determine organizational effectiveness. Although many external forces beyond the control of individual employees have significant consequences for the ultimate survival and success of the firm, the aggregated effects of individual employee behaviors are primary determinants of the organization's long-term success or failure. Thus, identifying the needed employee behaviors is the first task in developing HR systems that support knowledge-based competition. Having identified the required behaviors, employers must also ensure that employees have the needed competencies, are motivated, and

have opportunities to engage in the behaviors. Thus, these four objectives represent the primary tasks of any HRM system (Jackson & Schuler, 2002; Schuler, Jackson & Storey, 2001).

In this chapter, we use the four tasks of human resource management to organize our discussion of the preceding chapters. For each task, we attempt to state tentative principles regarding the HR practices that employers should adopt to manage knowledge effectively. In addition, we identify additional research that would be useful for improving our understanding of how HR practices can be used to manage knowledge effectively. Throughout our discussion, we assume that *all* elements of an HR system are potentially relevant to accomplishing each of the four tasks. This basic framework is illustrated in Figure 1.

Figure 1 Here

Identifying the Behaviors Needed for Knowledge-Based Competition

To design an HRM system that facilitates successful knowledge-based competition, it is necessary to first specify the behaviors needed in organizations pursuing knowledge-intensive strategies. Although empirical research is needed to verify the assertion that knowledge-based competition requires employees to engage in a set of idiosyncratic behaviors, there is a developing consensus among management concerning the behaviors needed in organizations that compete on the basis of knowledge. Two general categories of needed behaviors are generic knowledge-management behaviors and firm specific knowledge-management behaviors. Our discussion in this chapter focuses on the generic behaviors needed for knowledge-intensive strategies.

It is widely assumed that the generic behaviors needed for effective knowledge-based competition are: acquiring knowledge, creating knowledge, sharing knowledge, applying knowledge, and updating knowledge. In Chapter 6, Pulakos, Dorsey and Borman offer generic definitions for most of these behaviors. While it is important to support these behaviors for so-called "knowledge workers", the need to manage knowledge extends beyond this select group to include the entire workforce of an organization that seeks to gain competitive advantage in the emerging knowledge-based economy.

In addition to the generic behaviors described here, successful knowledge-based competition requires some firm-specific behaviors, which reflect particular objectives and conditions of the organization. Industry-specific and market-specific behaviors, between the two extremes of generic and firm-specific behaviors, may also be required. We do not describe these more specific behaviors in the present volume, nor do we assume that the tentative principles that apply to generic behaviors necessarily apply to firm-, industry- and market-specific behaviors.

Knowledge Acquisition

Most authors of the chapters in this volume worked with the basic assumption that, ultimately, knowledge is an attribute of individuals (refer to Chapter 1). If knowledge is an attribute of individuals, organizations have two general options for acquiring needed knowledge: help current employees acquire the needed knowledge and/or acquire new employees who have already have that knowledge. Typically, organizations facilitate knowledge acquisition among employees through training and development programs (Noe et al. Chapter 8). In some instances, however, current employees may lack the background or ability necessary to acquire the needed knowledge, or it may take them too long to acquire the new knowledge needed by the organization. Mergers, acquisitions, and multiple types of strategic alliances (See Deeds Chapter 2) and the use of contract workers (See Davis-Blake & Hui, Chapter 7) enable organizations to obtain new members with the appropriate knowledge.

The two options that organizations can use to acquire new knowledge seem straightforward, yet neither is foolproof. Thus research is needed to identify the obstacles that organizations face when using these tactics, and to develop solutions that overcome the obstacles. For example, rapid changes in the knowledge held by employees present a significant challenge to the design and implementation of training programs. Many training programs are designed to impart specific knowledge to employees. The development of such training programs requires the developers to identify, encode, and then transmit the knowledge deemed most relevant. In knowledge-intensive environments where knowledge is continuously changes, this "spoon-feeding" approach is likely to be inefficient and ineffective. Rather than train employees in knowledge *content*, it may be more appropriate to develop employees' knowledge acquisition skills. Employees with effective knowledge-acquisition skills can then be relied on to identify the knowledge they need and develop personal strategies for acquiring that knowledge--strategies which may or may not require support from the organization. Furthermore, training is designed largely to provide explicit knowledge and the latter approach allows employees the flexibility to obtain both explicit and tacit knowledge.

Firms that seek to acquire knowledge resources externally also face obstacles. Although obtaining knowledge resources is a primary reason for many mergers and acquisitions (Vermeulen & Barkema, 2001), sometimes these knowledge resources (scientists or top management team members) are the first to leave the new organization (e.g., Cannella & Hambrick, 1993). Some frameworks exist for understanding why executives depart under these conditions (e.g., Walsh, 1988; Hambrick & Canella, 1993), but additional research is required to determine whether these frameworks apply to all types of employees who possess critical knowledge.

Knowledge Creation

For knowledge-based competition, *unique* knowledge is particularly valuable. By applying their unique knowledge, organizations are able to offer products and services that competitors cannot match. Due to the value of unique knowledge, creative behaviors are widely acknowledged as key behaviors for successful knowledge-based competition.

Creativity involves bisociation--the integration of complex matrices of information (Smith & Di Gregorio, 2002). Employees who are more creative integrate more advanced and unrelated information matrices. Of all the generic behaviors required for knowledge-based competition, creativity is probably the most widely studied. As Oldham describes (Chapter 9), such research suggests several issues that organizations need to address in order to create conditions that optimize employee creativity.

Most research on creativity and problem solving in organizations assumes that employees understand the problems to be solved. In the everyday life of organizations, however, the search for solutions is only part of the total process. Knowledge-based competition requires more from employees than applying their knowledge to generate creative solutions to known problems. Employees also must identify the problems to be solved, articulate them in meaningful and compelling ways, and then gather new and relevant information that can be used to address the problems (e.g., see Sheremata, 2000; Thomas, Sussman & Henderson, 2001).

Given the importance of knowledge creation, research is needed to understand how organizations can foster it. Mohrman (Chapter 4) suggests that knowledge creation can be facilitated through the design of work, but empirical research is needed to develop principles for designing of work teams that effectively identify the need for new knowledge and can then generate such knowledge. Also needed is research that suggests how to supervise and manage

such teams. For example, organizations may be able to increase creativity by teaching managers to provide developmental feedback, avoid close monitoring of employees, and create a supportive climate (Oldham, Chapter 9; Zhou, In Press).

Knowledge Sharing

The acquisition or creation of knowledge is critical for an organization to compete effectively in a knowledge-based economy, but these processes do not guarantee success. For the organization to benefit most from employees' knowledge, that knowledge must be shared. Knowledge sharing promotes widespread learning and minimizes the likelihood of wasting resources to repeatedly solve the same problem. Conversely, knowledge hoarding is widely viewed as a common dysfunctional behavior (see Lepak & Snell, Chapter 5).

The diffusion of knowledge throughout an organization has been referred to as knowledge flow (see Fiol, Chapter 3). When knowledge flows through an organization, it increases individual and organizational learning. Two types of knowledge flows typically found in organizations are feed-back knowledge flows and feed-forward knowledge flows (Bontis & Crossan, 1999). Feed-back knowledge flows occur when organizational practices provide employees with information that is useful in doing their work. Performance evaluation and career development activities generally support feed-back knowledge flows, and these practices have been the focus of much research.

Feed-forward knowledge flows occur when the knowledge and experiences of individuals and work groups are used to inform strategic decisions. In comparison to the amount of research focused on understanding how to manage feed-back processes, HR researchers have devoted relatively little attention to developing principles for managing feed-forward knowledge flows. Research on participation in decision making, suggestion systems and quality circles should all be relevant to understanding feed-forward processes, but these topics have not claimed the attention of many researchers during the past decade. In the future, HR research could contribute to improving feed-forward knowledge flows by examining how practices such as staffing, training and development, performance management, and allocation of rewards can be used to support an organizational culture that promotes feed-forward knowledge flows.

In order to conduct studies of knowledge sharing, researchers will need to develop measures of knowledge sharing behaviors. Boudreau (Chapter 13) cites several examples of research that illustrates how this might be accomplished. Clearly, research on knowledge sharing is in its infancy and creative approaches to measurement may be needed to advance our understanding of knowledge-sharing behaviors. In addition to the measurement approaches described by Boudreau, interested researchers will likely find it useful to adapt some of the methods that have been developed to study communication networks (e.g., see Brass, 1995; XXXSAGE book—SJ to supply this cite)

Knowledge Application

Knowledge that is available but never applied is of little use. Unless employees apply their knowledge appropriately, investments in knowledge acquisition and knowledge creation will not produce returns. Several chapters in this volume suggest problems that might prevent employees from applying their knowledge. To the extent that knowledge use is an intentional behavior, employees must not only possess the required knowledge, they also must *recognize* that they have the required knowledge, be motivated to use it, and believe that it is feasible to use it. Substantial evidence from laboratory studies of groups shows that people often fail to apply their available knowledge to the problems they face (see Thompson, Levine & Messick, 1999).

Yet, very little research addresses the question of how to ensure that the knowledge available in organizations is effectively used.

Research that examines the conditions that increase employees' use of available knowledge—both explicit and tacit--is clearly needed. Finding ways to increase employees' use of tacit knowledge may be especially challenging. While employees are likely to recognize that they have various types of explicit knowledge, they may be less aware of their tacit knowledge. Thus, while the conditions that facilitate transfer of training in general may be useful for ensuring that employees apply their explicit knowledge, the same principles may not be effective for encouraging the use of tacit knowledge (e.g., see Noe et al., Chapter 8).

Motivational conflicts may also inhibit knowledge application. For example, knowledge workers may experience conflicts between employers' expectations regarding appropriate uses of their knowledge versus professional, legal and ethical expectations (Maurer et al., Chapter 11). Additionally, even when employees recognize that they have useful knowledge and are motivated to use it, they may encounter obstacles to use it. For example, contract workers may find it difficult to apply technical knowledge developed in other contexts to an organization's specific operations (Davis Blake & Hui, Chapter 7). Given the increasing importance of ensuring that an organization's available knowledge is actually used, research is needed to improve our understanding of the employment conditions that are most effective for ensuring that employees of all types apply the knowledge they bring to an organization.

Future research might also consider how decision-making processes should be structured to optimize the use of available knowledge. Are there conditions under which it is inappropriate for individuals or teams to use all of their available knowledge? For example, prior research has shown that individual performance feedback is not always effective, and may even be detrimental in some situations (cf., Kluger & DeNisi, 1996). When knowledge changes so rapidly, how can organizations ensure that their decision making processes and management practices incorporate the most current knowledge while at the same time recognizing that this knowledge will quickly become obsolete?

Toward Improving Our Understanding of the Behaviors Needed for Knowledge-Based Competition

For knowledge-intensive organizations, an understanding of the knowledge management behaviors that are most critical to gaining a competitive advantage should serve as the foundation for building the organization's human resource management system. Unfortunately, however, the job analysis and competency modeling tools that are most widely used today were *not specifically* developed to assess the importance or frequency of the complete set of generic knowledge management behaviors. Thus, continued reliance on these existing tools may inadvertently lead to inadequate specifications of the behavioral requirements of knowledge-intensive organizations. During the past decade, I/O psychologists have developed job analysis and competency modeling tools tailored to service-based organizations; use of these tools yields information that is particularly helpful as the foundation of HR systems in service organizations. During the next decade, the development of analytic tools that are tailored to knowledge-intensive organizations could prove equally valuable. Importantly, tools are needed to identify not only individual-level knowledge management behaviors, but also team- and organizational knowledge management processes and routines.

For organizations that compete on the basis of knowledge, the five generic knowledge management behaviors provide a starting point from which to develop an organization-specific profile of knowledge management needs. For any particular organization, some of the generic

behaviors listed may be relatively more important, and others may be less important. For example, knowledge acquisition and creation may be relatively more important for a firm that competes for customers on the basis of innovative products and services. For firms that seek to satisfy customers by providing the highest quality products and services, knowledge sharing and application may be relatively more important as the organization strives for continuous incremental improvement. For firms implementing a mergers-and-acquisitions strategy, greater priority may be assigned to knowledge sharing across the boundaries that previously separated the combined companies and to learning from the knowledge stocks of each other. Of course, the knowledge-based profiles of organizations could be articulated more precisely by also considering how the profile differs for work carried out at different stages in the firm's value chain.

As these hypothetical examples suggest, the profiles of firms' most valued knowledge management behaviors could serve as a basis for identifying organizations with similar objectives to be achieved through their HR system. The ability to classify organizations according to their behavioral knowledge requirements would be useful for both research and practice. For example, studies in strategic management could assess the extent to which behavioral profiles predict future strategic moves. In terms of practice, the ability of managers to assess the similarities and differences in behavioral profiles could be useful for evaluating the attractiveness of potential alliance partners, and for choosing organizations that might be usefully included in benchmarking exercises. Within HR research, studies might be conducted to evaluate whether various indicators of organizational effectiveness (as evaluated by employees, customers, managers and shareholders) are associated with developing a closer match between organization-level profiles of required knowledge management behaviors and the knowledge management competencies of the workforce.

Ensuring Employees have the Competencies Required for Effective Knowledge-Management Behavior

Psychologists use the term "competency" to refer to the knowledge, skills, personality characteristics and attitudes make it possible for employees to perform work tasks and roles (Jackson & Schuler, 2003). Knowledge-management competencies can be described by referring to their type (e.g., cognitive abilities, service orientation) and degree (low versus high) (Pulakos, Dorsey & Borman, Chapter 6; Lepak & Snell, Chapter 5). For organizations competing on the basis of knowledge, individual competencies that support knowledge management behaviors are of special interest.

A key challenge for knowledge-intensive organizations is ensuring that individual employees have the competencies they need to effectively carry out the generic and firm-specific knowledge management behaviors required by a firm's particular strategy.[1] If an organization's stock of knowledge management competencies fits its behavioral requirements, the workforce is capable of creating a competitive advantage. Consider, for example, the generic competency of knowledge acquisition. During the past decade, changing information technologies have created many new means for employees to acquire knowledge (e.g., searching the Internet, using email to communicate with experts, participating in distance learning). In order to maintain their

[1] In the strategic management literature, the term "competency" is a firm-level concept that refers to capabilities or bundles of resources that contribute to achieving a competitive advantage (Hitt, Ireland & Hoskisson, 2003). Here, we focus on the use of HR practices to ensure that an organization's workforce has the individual-level competencies required for successful knowledge-based competition.

employees' knowledge-acquisition current, employers may offer training and/or acquire new employees who have these competencies, as we have already discussed.

Several HR practices can be used to increase an organization's stock of relevant competencies. Clearly, the recruitment and selection of new organizational members influences the stock of competencies, as do training and development activities that promote learning. In addition, reward systems can provide incentives for employees to acquire valued competencies. Attending to the organizational culture can make it easier to recruit and retain employees who have the desired competencies, and competency assessment and measurement can be used to monitor competency stocks. Overall, it is likely that most of the basic approaches used to increase the employees' competencies in general also apply to increasing the stock of competencies that support knowledge management behaviors. Nevertheless, knowledge-intensive competition also poses some special challenges, as described next.

Managing the Explicit and Implicit Competencies of Individual Employees

For individual employees, changes in the knowledge-management competencies that firms need create a demand for continuous learning, adaptation and change (Noe et al., Chapter 8). Keeping their stock of competencies current may require employees to update their technical knowledge, add new skills, shed obsolete attitudes, and so on. For knowledge-intensive organizations, a major challenge is ensuring that the competencies present in their workforce as a whole evolves to meet changing environmental conditions (see Lepak & Snell, Chapter 5).

Extensive research on learning processes, training techniques and employee development provides a wealth of information that organizations can use to promote individual learning and change (e.g., see Goldstein and Ford, 2002). However, it must be acknowledged that, to a great extent, these principles have been designed to address to the development of "explicit" competencies—that is, competencies that can be articulated and codified. Similarly, many of the constructs that Pulakos et al. (Chapter 6) identified as useful predictors of knowledge workers' performance represent explicit competencies. Explicit competencies are amenable to formal and systematic management. They can be measured and transferred with relative ease. Technical knowledge is one example of an "explicit competency."

In contrast to explicit knowledge and skills, tacit competencies are more difficult to articulate and measure, and so they are more difficult to manage. "Creativity" (or creative problem solving ability) may be an example of a "tacit competency." Some interpersonal skills and environmental sensing abilities may also be examples of tacit competencies. Tacit competencies are typically ignored by formal HRM practices. Because they are difficult to measure and teach, it has been assumed they cannot (or should not) be managed. Of course, the ease of measuring and managing the competencies needed for knowledge management may have no relationship to their importance. Thus, research that illustrates effective approaches to measuring and managing tacit knowledge should be given high priority.

Knowledge management scholars have argued that extensive interpersonal contact between teachers and learners provides the best means for transferring tacit knowledge (see Fiol, Chapter 3). Thus, one approach to managing tacit competencies may be to develop social networks that link together a broad cross-section of individuals, including employees and others who are not members of the organization. If tacit competencies are transferred and learned implicitly and informally, individuals who are embedded in strong social networks should be more likely to update their tacit competencies and add new tacit competencies as they become available. Focusing on the competencies of work teams and larger organizational units is one approach to addressing the conundrum of managing tacit competencies. Clearly, new research is

needed to improve our understanding of how individuals and teams learn, update and revise their tacit competencies.

The Dynamic Nature of Knowledge Management Competencies

Recent studies of knowledge-based organizations highlight the fact that managing competencies is a dynamic process (e.g., see the Special Issue on the Knowledge-Based View of the Firm published in the *Strategic Management Journal*, 1996). The value of extant knowledge erodes quickly over time, and the search for new knowledge is continuous. Similarly, the value of competencies currently held by an organization will diminish unless they are updated or changed (Lei, Hitt & Bettis, 1996). Competency obsolescence may be especially problematic for firm-specific, industry-specific and market-specific competencies. The dynamic nature of knowledge is a major reason that organizations value knowledge and consider it such an important strategic asset. Thus, organizations engaged in knowledge-based competition need HRM systems that promote the continuous evolution of the competencies required. Such systems must address the need for changes in individual competencies as well as changes in the organization's total stock of competencies.

Several chapters in this volume describe issues related to employee movement into, out of, and between organizations, and each is relevant to an understanding of the issues that must be addressed as organizations attempt to match the competencies of their workforce to their knowledge-management requirements. For example, Oldham (Chapter 9) argues that employees who intend to remain with an organization are more likely to share their ideas with coworkers. Thus, encouraging employee retention (see Maurer et al., Chapter 11) is one way to increase the internal transfer of tacit competencies and ultimately build the organization's competency stocks.

As described by Davis-Blake and Hui (Chapter 7), many firms use contract labor as a means of temporarily acquiring competencies. But contract labor generally cannot be used to fulfill all of the firm's needs. Ultimately, most organizations will want to increase their stock of workforce competencies by hiring new employees (or acquiring a firm with many of the needed competencies in its workforce—Hitt, Harrison & Ireland, 2001). Except under conditions of sustained growth, on organization's ability to hire new competencies is partly dependent on their ability to manage the outward flow of current employees.

Thus, a useful direction for future research would be developing analytical tools to help organizations assess and track *changes* in their *portfolio* of competencies. To be valuable, such tools must provide timely information on which actions designed to develop the needed competencies can be implemented. The conceptual work presented by Lepak and Snell (Chapter 5) should provide a useful foundation for future research on this issue.

Motivating Employees to Engage in Knowledge Management Behaviors

Motivational forces influence the behaviors in which employees choose to engage as well as the effort invested in those behaviors. Most psychological theories of motivation recognize that decisions about how to behave and how much effort to exert are influenced by both employee characteristics (including their competencies) and the work environment. In the preceding section, we noted that many elements of an HRM system can be used to ensure that an organization's workforce has competencies necessary to contribute to knowledge-based competition. In this section, we consider how HR practices can influence the likelihood that employees *will* engage in the knowledge management behaviors required by their organization. Our discussion is organized around three key issues: the decision to participate in the organization and its activities, initiative and self-direction, and effort expended.

The Decision to Participate

Although employment decisions are essentially voluntary for all U.S. employees, descriptions of knowledge-based competition often highlight the ability of knowledge workers to exercise their free will when deciding which organizations to join, on which projects to work, whether to participate in various informal communities of practice, and so on. The tight labor market conditions of the past decade and a view that knowledge-work requires technical knowledge (although knowledge work is much broader) reinforce the belief that knowledge workers have relatively greater freedom to choose where, when and how they work (see Chapter 11).

Clearly, employers need to understand how employees make decisions about whether to participate in various organizational roles and activities, yet these decision processes have not received much research attention. Some researchers have studied job applicants' reactions to employers' hiring practices and the consequences of these reactions for acceptance of job offers, but this work addresses only a small piece of the larger topic of employee decisions to participate in organizations (and how they will participate). Participants in research on job acceptances often are young professionals selecting their first full-time employers. Or, perhaps they are more experienced employees making a decision about whether or not to accept an expatriate assignment. In a knowledge-based economy, decisions to participate extend far beyond accepting or rejecting job offers for full-time employment at home or abroad. For example, in Chapter 2, Deeds explores employees' decision to stay or leave a company after it has been acquired. Given the prevalence of mergers and acquisitions in recent years, this is a critical knowledge retention issue for the acquiring firm. When high-quality employees of the acquired firm leave, the new firm loses considerable value and increases the challenges for realizing synergy from the merger.

After they agree to join the organization, employees of all types almost always have some discretion to engage in some tasks or proactively seek involvement in some projects and activities. Other participation decisions that are important for knowledge-based organizations to understand include employees' decisions about which project teams to join, whether to accept informal leadership and advocate roles, whether to participate as an instructor, who to mentor, and so on. Decisions such as these can influence the performance of employee and others throughout the firm who are affected by the decision. Consider, for example, decisions about whether to participate in training programs, when to participate in such programs, in which programs they participate, and how much of their own knowledge they share with others during the course of their training. In making such decisions, employees shape the development of their own portfolio of competencies and also affect the knowledge portfolios of others. Research that enhances our understanding of how employees make these participation decisions will ultimately help to improve knowledge management within organizations.

Self Direction

Having agreed to participate in an organization, project or activity, employees attend to numerous environmental cues that influence their daily behavior. Job descriptions and work goals are among the most explicit cues that guide the *direction* of employee behaviors. In addition, employees learn behavioral norms by attending to the actions of others and the consequences associated with those actions—that is, they attend to the cues provided by the organization's culture (see Tetrick & DaSilva, Chapter 12). As Mohrman explains, however, knowledge-intensive organizations also rely on their employees being self-directed: "In a dynamic knowledge environment, work can't be fully specified—much must be left to employees' discretion and initiative. Employees are required to focus on the purpose and strategy

of the larger system in order to know how to focus their work" (Chapter 4). Conversely, knowledge workers expect their employers to permit them considerable autonomy in carrying out their responsibilities.

How can HR practices direct employees' attention to the "purpose and strategy of the larger system"? The chapters in this volume suggest that well-designed compensation plans (Lawler, Chapter 10), training programs (Noe et al, Chapter 8), and measurement practices (Boudreau, Chapter 13) can align the direction of employees' behaviors with the strategic objectives of the firm. In addition, assessments of organizational climate and culture can be used to evaluate employees' perceptions of the behaviors and competencies that are valued (Tetrick & Da Silva, Chapter 12).

Whereas there is no shortage of conceptual work on designing HR practices that provide direction for employees, more empirical work is needed. In particular, research is needed to demonstrate the practical steps that organizations can take to establish a "line of sight" between their behavior and the ultimate success of the organization (cf., Boswell, 2000). For example, one useful approach may be to involve employees in the design and implementation of HR practices. Employee participation in the design of HR practices may improve employees' understanding of organizational goals as well as help to ensure that training programs, measurement practices and compensation plans communicate the intended messages and provide the appropriate incentives concerning the competencies and behaviors that the firm values.

New research on the use of goals may also be helpful. The motivational effectiveness of goals is well-established (Locke & Latham, 1990). When people perform simple and routine tasks, goals appear to increase effort. But when people perform complex tasks and those that require them to learn strategies to enhance their performance, then "do your best" goals are more effective than specific performance goals (Earley et al., 1989; Kanfer & Ackerman, 1989). The apparent reason that specific performance goals are ineffective for employees working on complex and novel tasks is that they interfere with the experimentation and learning that is required to master such tasks. For knowledge-based organizations, goal setting may be most useful when it is used to promote learning (e.g., see Winters & Latham, 1996). Research that examines how to effectively use goals in organizations that rely on self-directed employees who engage in continuous learning is needed to extend the usefulness of goal-setting theory in a new era of knowledge-based competition.

Maximizing Effort

Variability in the effort exerted by employees occurs in two ways: the amount of effort expended at a point in time can be relatively great or small, and the total amount of time (e.g., hours per week) during which effort is expended can be relatively great or small. Two HRM practices that employers can use to maximize both forms of effort are work design and rewards.

Work design. Coincident with the evolution of the knowledge economy has been a shift in the design of organizations and jobs. As knowledge-based competition has intensified, so too has the prevalence of enriched, team-based jobs with many potentially motivating attributes. As Mohrman (Chapter 4) explains, however, the design features that would seem to enhance the motivational quality of knowledge work (e.g., significance, variety) may also contain the seeds from which motivational problems grow. For example, the collaborative and team-based nature of knowledge work should enhance employees' experience of task identity. However, the size and complexity of many knowledge-work projects can be so immense that knowledge workers actually find it difficult to identify with the project as a whole. Like assembly line workers,

knowledge workers may sometimes find it difficult to see the connection between their own efforts and the vision for the organization.

Work designs are changing in other ways, as well. The boundary that separates an organization from its environment has long been recognized as permeable, but increasingly organizations are becoming boundaryless (Bowman & Kogut, 1995). As Deeds (Chapter 2) explains, alliances, joint ventures, mergers and acquisitions all represent strategic actions that enable firms to change or reduce organizational boundaries between firms. As Fiol (Chapter 3) notes, information technologies help to sustain global communities of practice that connect people with common interests and knowledge, regardless of where they are employed. Simultaneously, the boundary that separates work from nonwork life is becoming less distinguishable. Because knowledge can be easily transmitted through space and time, knowledge work is more easily carried out at dispersed locations, including from employees' homes (Mohrman, Chapter 4; Oldham, Chapter 9). And, as employers have increased their reliance on contract labor, they are more accepting of having work performed off-site—e.g., at the contract workers home or another work site. For better or worse, knowledge work often permeates the lives of employees. One consequence of this change in work design is that it is no longer possible to ignore the ways in which conditions beyond an organization's formal boundaries can influence knowledge management behaviors. The "design" of an employee's nonwork life as well as the design of work in other organizations with which an employee has some contact can influence the employee's motivation to engage in the knowledge management behaviors of interest to an employer.

Rewards. Of all the HR tools available for managing employee motivation, recognition and rewards often are assumed to be the most powerful. Yet, they are probably the least understood. Researchers continue to hold highly differing views about the effects of rewards on employees, despite many studies on the topic. Some of these differences in perspective are reflected in this volume. One the one hand, Lawler (Chapter 10) asserts that contingent rewards serve the dual role of directing employees' attention to the most important aspects of their work and motivating them to exert maximal effort; as such, they can be effectively used to support the behaviors needed for knowledge-based competition. Lawler's arguments are consistent with research showing that organizations are more likely to achieve their stated goals when employees are rewarded for results that are consistent with those goals (i.e., Montemayor, 1996; Shaw, Gupta & Delery, 2002). Oldham (Chapter 9), however, cautions that aggressively tying rewards to achieving creative outcomes may reduce rather than increase creative output. To avoid this problem, Oldham offers a counter-intuitive suggestion: Instead of immediately recognizing employees' efforts by paying bonuses or offering other valued rewards, he recommends offering small rewards and giving them only after considerable time has elapsed. Research that yields practical suggestions for how to develop effective reward systems in knowledge-based organizations is sorely needed. Similarly research is needed to better understand how all elements of an organization's HR system affect the motivation of the work force.

Providing Opportunities for Knowledge Management Behavior

Even if employees understand that knowledge management behaviors are valued in their organization, they have the required competencies to engage in these behaviors *and* they are motivated do so, employees may fail to manage knowledge effectively due to a lack of appropriate opportunities. In order to leverage the knowledge management capability of a workforce, organizations must make it easy for knowledge to flow into and throughout the organization. In the language of Boudreau (Chapter 13), knowledge management is more likely

to occur when it is enabled by the structural aspects of the environment. Similarly, Oldham's (Chapter 9) discussions about the importance of workspace designs hint at the importance of designing appropriate opportunities for knowledge creation. Next, we consider two approaches that organizations have used to improve knowledge sharing opportunities: electronic knowledge management systems and team-based organizational designs.

Electronic Opportunities for Knowledge Management

During the 1990s, the installation of new information and knowledge management systems was a popular approach for providing more opportunities to employees for engaging in knowledge acquisition, creation, sharing, application and updating. By design, electronic knowledge management systems were intended to make it easier for employees in an organization to recognize that they face similar challenges, discover each other, discuss common problems, and collaborate in finding solutions. In practice, however, electronic knowledge management systems appear to have been most useful for knowledge storage and passive knowledge distribution than for stimulating employees to search for new knowledge used for creativity and innovation. Furthermore, most information technologies do not support any form of tacit knowledge management. For creativity, innovation and tacit knowledge management, person-to-person exchanges appear to be more useful than document exchanges (Hansen, Nohria & Tierney, 1999).

Furthermore, as the discussion of Fiol (Chapter 3) and Noe et al. (Chapter 8) indicate, knowledge management technologies that simply reproduce ineffective communication patterns will not achieve the objective of improving an organization's knowledge management practices. If bureaucratic procedures and organizational boundaries ensure that employees are most likely to communicate with other people having similar and related knowledge, the means of communication is of little consequence. Although an electronic information management system may make it easier for people to communicate across geographic distances, it is not likely to overcome communication roadblocks caused by administrative and structural barriers.

Most readers of this volume are not likely to conduct the type of research needed to improve the design of electronic knowledge management systems, in general. But they may be particularly qualified to conduct research on the effective design of one type of electronic knowledge management system—namely electronic HR systems. For example, there has been research on the use of computer-monitoring in performance appraisal,. Although many views of this type of intervention have been negative, and have emphasized the increased stress involved (e.g., Amick & Smith, 1992; Chalykoff & Kochan, 1989), others have found that computer monitoring can improve the performance of more highly skilled employees (e.g., Aiello & Kolb, 1995). Therefore, it is possible that computer-based appraisals might be more effective with knowledge workers or in settings where the creation and dissemination of knowledge is important. There has also been research on computerized cognitive ability tests for selection (Mead & Drasgow, 1993), computer based interviewing (Martin & Nagao, 1989), and computer based attitude surveys (Lautenschlager & Flaherty, 1990). Perhaps these methods will be more effective when dealing with employees who work in knowledge-oriented jobs, since these employees are likely to be more comfortable around computers and electronic communications. Clearly these are important directions for future research.

For decades, science fiction writers have painted a future in which computers are as "intelligent" as humans. But as scientists working in the field of artificial intelligence now know, the task of creating a computer that matches the abilities of humans—to learn, see simple

patterns embedded in a complex array of visual cues, synthesize information and give it new meaning—has yet to be accomplished. Without question, computers are more effective than people when it comes to storing, manipulating and distributing the information that people contribute. But they can do so only to the extent that people articulate useful knowledge and enter it into the electronic system. Even in the best companies, most knowledge never appears in documents or databases. The vice president of knowledge management at Unisys recently estimated that only 2% of their firm's knowledge is ever written down; 98% resides inside people's heads. Perhaps this is why, according to some estimates, knowledge management activities at Xerox—a widely recognized KM leader--is 20% technology and 80% people.[2]

The problem company's face is not simply that people *don't* record everything they know; the problem is that people *can't* record everything they know because much of their knowledge is implicit or tacit. Valuable tacit knowledge is often created and shared through social interactions--with experts, with customers, and even with competitors. For this reason, learning organizations encourage face-to-face encounters. Meetings around the water cooler are encouraged rather than discouraged. Social events, network builders, mentoring, classroom-based workshops, conferences and community service are all seen as forums for developing and sharing tacit knowledge. Restructuring work places to include more shared community space also supports knowledge sharing and learning via informal conversations. These community spaces may include new forms of conference rooms without doors or walls specifically designed to invite, foster and encourage informal conversations among employees. Looking for a new way to support face-to-face knowledge exchanges, one company considered moving its coffee shop from the in-house restaurant to the company library. Ultimately, the idea was never implemented due to building code restrictions. Nevertheless, this company was on the right track--it recognized that minor spatial arrangements can have major implications for the creation and sharing of knowledge.

Consider the tacit knowledge that is needed to function effectively in a new culture—for example, understanding how to close a deal with a major client in another country. One can read about the values and norms of that country, but the usefulness of written descriptions is limited. Understanding how a country's values and norms shape day-to-day business operations is virtually impossible without face-to-face conversations with experienced colleagues who have firsthand knowledge. The importance of cultural knowledge pervades business activities. In the pharmaceutical industry, for example, a company's ability to acquire tacit cultural about the FDA may result in superior drug applications, reduced time for review and approval, and an earlier product launch. Considering that a blockbuster drug may generate annual sales of billions of dollars, each day is critical in a highly competitive market.

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Whether tacit or explicit, knowledge creation and knowledge sharing almost always involve some direct communication and interaction between people who have expertise and people who wish to use the expertise. Thus, knowledge-based activities must ultimately recognize and overcome a variety of social barriers. We have already alluded to one social barrier that blocks knowledge sharing—the finger-pointing blame game that often follows failure. Fear of losing power is another social barrier to knowledge sharing. Clearly, knowledge is power in today's knowledge economy—so sharing knowledge means sharing power, or

[2] K. Husted and S. Michailova (2002). "Diagnosing and fighting knowledge sharing hostility." *Organizational Dynamics* 21 (1): 60-73.

perhaps even losing one's power. In a turbulent and uncertain job market, tacit knowledge is a critical source of individual competitive advantage. The issue of power is woven into the fabric of a variety of social barriers related to knowledge sharing.

Another social barrier that restricts the free flow of knowledge stems from the judgments people make about each other's credibility and trustworthiness. Unfortunately, these judgments may be based on biases and stereotypes instead of the actual credibility and trustworthiness of the people involved. For many employees, it is difficult to trust a stranger. A user of Textron's knowledge management system put it this way: "We don't know the people responding [to electronic inquiries] in most cases, and there are no metrics for the quality of responses. [So] we'll make decisions based on people we know, not people we don't know. Credibility is the name of the game."[3]

In any large organization, people know only a subset of the members. And who do people tend to know? Management scholars have conducted numerous studies of the friendship and communication networks that develop in work organizations, and the findings are clear. People tend to know and more easily trust those who are similar—that is, those of the same gender, approximately the same age, and with the same racial or ethnic background. How does this affect knowledge sharing? Studies of communication networks suggest that demographic differences between employees may interfere with knowledge sharing unless organizations take specific steps to override the natural tendency of people to communicate more easily with those who are similar and those who are familiar. A consulting firm did just that when it adopted the practice of setting aside the third Friday of each month as a day when everyone would get together. Typically, the consultants worked at their clients' offices, leaving the home office virtually deserted. Especially during the most active business periods, the consultants seldom had time for personal interaction with each other. To increase social contact and make it easier to keep up with internal developments, they agreed that each month one of the offices would host a gathering on the third Friday. Over time, these gatherings provided the consultants with more opportunities to build personal relationships and establish greater trust amongst them. Parties, social outings, face-to-face meetings, and other activities that encourage employees to get to know each other can help, but especially in large companies they will never solve the problem completely. Recognizing that a more formal solution was needed, one company developed a network of "knowledge integrators." The knowledge integrators help bring together people in different areas of the company to share their knowledge. If a project manager needs to locate a subject matter expert for assistance with an acute problem, she contacts a knowledge integrator, who then locates the right person. Because the knowledge integrators have deep knowledge about the business as well as the people, they can locate relevant knowledge and filter through irrelevant information.

When the objectives of project teams or communities of practice include learning from others and developing creative solutions, most people agree that diverse perspectives are needed. Indeed, the growing use of teams reflects the faith that people have in the value of diversity. Beyond internal initiatives, many organizations develop alliances with suppliers, customers and even competitors to gain new knowledge. International Sematech is an example of a multilateral alliance that supports learning through collaborative research. Through joint participation, 13 semiconductor manufacturers from seven countries share knowledge and expertise in ways that ultimately influence the entire industry. Network structures like this are intended to maximize

[3] Foote, E. Matson, L. Weiss, and E. Wenger. (2002). Leveraging group knowledge for high-performance decision making. *Organizational Dynamics*, 31(3): p. 288.

knowledge flows among organizations. Such links can improve the organization's understanding of problems that lie beyond its own boundaries as well as motivate other members in the network to share knowledge and expertise to find creative solutions.

Substantial research supports the view of diversity as a valuable resource. As anyone who works in a diverse team knows, however, creativity and learning do not always come easily for diverse teams. Interpersonal conflicts, slower decision making, and greater turnover among team members are among the costs of team diversity, and this is true regardless of the source of diversity (e.g., differences in functional expertise, industry experience, age, tenure, ethnicity, gender, and so on).[4]

When team members share too little common ground, the team may be unable to use its diversity effectively—not because the members lack basic competencies or because they are unmotivated, but because effective communication is too difficult. Fortunately, communication problems, whether related to diversity or not, can be managed by using agreed upon format and questions, and clear roles depending on the meeting's level of importance. Having pre-established roles such as note taker, synthesizer and knowledge integrators along with subject matter expert and facilitator may further reduce communication issues and foster knowledge sharing.

Relying on Teamwork to Provide Opportunities for Knowledge Management

In recognition of the limits of electronic knowledge management systems, organizations engaged in knowledge-based competition have been quick to adopt team-based organizational designs to increase opportunities for people to span boundaries that might otherwise be barriers to information flow (Bouty, 2000; Mohrman, Chapter 4). We agree that team-based organizational structures are likely to create more opportunities for employees to engage in effective knowledge management. Nevertheless, much more research is needed to provide insights about how to ensure that the opportunities for knowledge management within and between teams are optimized.

Knowledge-intensive organizations encourage the proliferation of cross-functional, multidisciplinary and even inter-organizational teams. These are not the familiar and static production-focused work teams often found in modern manufacturing or client-focused service organizations. Employees working in knowledge-intensive organizations often have broadly defined work responsibilities that require them to participate as members of *multiple teams*. For one project they may serve as the team leader; for another they are called upon occasionally as an expert advisor in a narrowly defined area. One project may require frequent meetings and close working relationships; another may require each person to make significant progress

[4] See Jackson, S. E., May, K. A., and Whitney, K. "Understanding the Dynamics of Diversity in Decision Making Teams," in R. A. Guzzo and E. Salas, eds., *Team Decision Making Effectiveness in Organizations,* San Francisco: Jossey-Bass, 1995, pp. 204-261; T. Kochan and associates, "The Effects of Diversity on Business Performance: Report of the Diversity Research Networks," *Human Resource Management Journal,* 2003 (in press).

working alone, with meetings of the whole team occurring only occasionally. Furthermore, these team structures are *dynamic*. As work requirements change, some new teams may be formed, other teams may be reconfigured or given new responsibilities, and/or a team may be disbanded. For knowledge-based organizations, it is assumed that a key advantage of team-based work is that it promotes the fluid movement of knowledge (Bontis & Crossan, 1999). That is, dynamic and flexible teams are a structural solution to the management challenge of ensuring that employees have many opportunities to acquire, create, share, apply and update their knowledge.

Although research on improving work team functioning has increased during the past decade, much of that research has assumed a static view of work teams and does not reflect the fluid and dynamic nature of work in knowledge-intensive organizations. As several chapters in this volume emphasize, successful knowledge-based competition depends on the *mobility* of knowledge. Knowledge becomes mobile through human interaction. Thus, it follows that human resource management practices can contribute to the success of knowledge-intensive organizations by identifying the optimal patterns of interactions needed for knowledge to become mobile, and encouraging and facilitating these interactions. Organizing employees into project teams may improve their opportunities to engage in effective knowledge management, but there is little understanding of how team design and team staffing influence knowledge sharing, creation, acquisition, application and updating among team members.

Despite their increasing popularity, cross-functional teams do not always achieve their objectives. Staffing decisions may contribute some of the problems that interfere with the performance of such teams. For example, a study of R&D teams found that high amounts of functional diversity interfered with the teams' technical innovativeness as well as their performance against schedules and budgets (Ancona & Caldwell, 1992). Other studies have found that demographic diversity within teams can increase conflict and turnover rates in the team (Jackson, May & Whitney, 1995). Such findings suggest that poor staffing may create situations in which team members have little opportunity for effective knowledge sharing. When team members share too little common ground, the team may be unable to use its diversity effectively—not because the members lack basic knowledge management competencies nor because they are unmotivated, but because effective communication is difficult. Nahapiet and Ghoshal (1998) argued that effective knowledge exchange is most likely to occur when a social network exists to facilitate the exchange (see Noe et al., Chapter 8). One implication is that team staffing decisions should attend to the social capital available to a team. Because a team's social capital is likely to be at least partly related to the demographic characteristics of team members (e.g., their age, tenure, gender and ethnicity), attending to the team's social capital is fraught with difficulties, especially for HR researchers and practitioners. Nevertheless, HR practices that ignore the enabling role of social capital may inadvertently detract from organization's ability to maximize its employees' knowledge management opportunities.

The internal composition of a team is not the only factor that can constrain or create knowledge management opportunities—connections between team members and others inside and outside the organization (i.e., internal and external social capital) also play a role. For example, a study of R&D teams found that functionally diverse teams were most effective when team members were well connected to an external network with whom the team members communicated (Keller, 2001; see also Ancona & Caldwell, 1992). The external communications of team members also influence knowledge transfer between firms that enter into strategic alliances. Such alliances, in turn, often spring from relationships that are forged through contacts between employees who represent their firms by serving on the technical committees of

cooperative technical organizations (CTOs). CTOs serve as a mechanism for members of an industry to collaborate and agree on shared technical standards for future products and services. In a study of firms that manufacture and service cellular products, participation in CTOs was related to a firm's subsequent involvement in strategic alliances among members of the CTO. Furthermore, the evidence indicated that subsequent strategic alliances were most likely when a firm's representative in the CTO was a long-standing member who had developed an extensive network of relationships with representatives other firms (Rosenkopf, Metiu, & George, 2001).

Findings such as these remind us that a team does not function in a vacuum. Just as the composition of the team shapes opportunities for effective knowledge management behaviors, the external intra- and inter-organizational landscape also shapes the team's knowledge management opportunities (Joshi & Jackson, in press; Tsai, 2002). Thus, when staffing teams, the question of who is *not* in a team may be as important as the question of who *is.* The development of HR practices that facilitate the creation of externally connected teams would appear to be useful. Again, however, more research is needed before prescriptions can be offered regarding how to design the "external" landscape of a team to maximize its opportunities for effective knowledge management.

Conclusions

Effectively managing human resources for knowledge-based competition requires adopting a strategic approach. A strategic approach to managing human resources recognizes that an organization's competitive environment and strategic imperatives should be reflected in the organization's HR practices. It also recognizes that the only sustainable HR practices are those that simultaneously address the needs of employees and those of employers. As described in Chapters 1 and 2, effective knowledge management has become a strategic priority for organizations across a wide range of industries. Likewise, many employees have begun to evaluate their employment conditions and opportunities based on the knowledge enhancing opportunities they provide. Thus, both employers and employees could benefit from research that improves our understanding of how HR practices can be used to continuously improve the knowledge management capabilities of employees.

In this chapter, we have argued that the design of effective knowledge-management practices begins with the identification of knowledge-management behaviors. Our discussion has focused on generic knowledge management behaviors that are generally cited in the extant literature: knowledge acquisition, knowledge creation, knowledge sharing, knowledge application, and knowledge updating. This list of behaviors should not be treated as definitive. Research is still needed to document the claim that firms engaged in knowledge-based competition are more effective. In addition, we encourage research to identify the knowledge management behaviors needed to succeed in specific industries and markets. The development of methods for identifying important firm-specific knowledge-management behavior should be pursued.

Assuming that the behaviors needed for effective knowledge-based competition can be identified, research is required to improve our understanding of the individual competencies and the contextual conditions that support or discourage the behaviors. For researchers who wish to study the relationship between individual competencies and knowledge management behaviors, the concept of tacit competencies, introduced in this chapter, may pose a particular challenge. Because tacit competencies are difficult to identify and measure, they may be ignored. We hope that this tendency will be resisted, however, for tacit competencies also may prove to be the most valuable to both employers and employees. Furthermore, whereas sophisticated HR practices for

managing explicit competencies already exist, there is a great need to develop equally sophisticated approaches for managing tacit competencies.

Regarding the contextual conditions that support or discourage effective knowledge management, we have briefly commented on (a) factors that signal the importance and desirability of these behaviors; (b) factors that motivate employees to engage in the behaviors, including conditions in the employing organization as well as conditions beyond the organizational boundaries; and (c) electronic and social structures that may expand or constrain opportunities for effective knowledge management. Clearly, a complete discussion of the conditions that influence knowledge management behaviors is beyond the scope of this chapter and this volume. Our objectives here were more modest.

One objective of our discussion was to highlight the wide range of contextual conditions to which HR researchers should attend as they strive to develop HR practices that support knowledge-based competition. [culture, team context, home, etc—SJ needs to list some specific]

A second objective was to emphasize that any particular HR practice can affect an employee in many different ways. Thus, research is needed that considers the *combined* effects of an organization's entire set of HR practices. To be effective, the elements that comprise the total HR system should jointly encourage and support workforce effectiveness by ensuring employees have the required competencies, are motivated to use these competencies, and have appropriate opportunities to engage in behaviors that contribute to competitive advantage. Under the traditional model of personnel management, each area of HR practice was closely tied to one or perhaps two particular tasks. For example, job analysis and competency modeling were viewed as relevant primarily for identifying the required behaviors. Staffing, training and development practices were viewed as relevant primarily for ensuring that individual employees had the required competencies. Performance management and rewards were viewed as relevant primarily for managing motivation. The issue of whether employees had appropriate opportunities to engage in the behaviors required for the organization's success was often ignored or assumed to be a given. By contrast, a strategic perspective assumes that all available HR practices can and should be used simultaneously to achieve the four major HR tasks.

A final objective for this chapter was to acknowledge the need for more integration of micro- and macro- research traditions at all stages of the research endeavor—from the formulation of a research question through the design of the study to the final interpretations and conclusions. In other words, we hope readers will be motivated to acquire new knowledge from other fields, share their own expertise with researchers who adopt different perspectives and methods, and work collaboratively with other researchers to generate new knowledge. We and the other chapter authors in this volume have attempted to engage in these same knowledge behaviors throughout the process of preparing this volume and have experienced the difficulties involved. Clearly, our efforts represent only the first step, and much more work is needed. For organizations to compete effectively in the future, they must simultaneously manage knowledge at macro (organizational) and micro (individual and team) levels. Thus, they need to understand how knowledge management practices aimed at each level of organization (e.g., within teams, between businesses) influence knowledge management at the other levels. Research that integrates available knowledge from the fields of strategic management, organizational theory, organizational behavior, and human resource management will be needed to create this understanding. We hope our volume serves as a catalyst for such research.

References

Aiello, J.R., and Kolb, K.J. (1995). Electronic performance monitoring and social context: Impact on productivity and stress. *Journal of Applied Psychology,* 80, 339-353.

Amabile, T. M. (1979). Effects of external evaluation on artistic creativity, *Journal of Personality and Social Psychology*, 37, 221-233.

Amabile, T. M., Conti, R., Coon, H., Lazenby, J., and Herron, M. (1996). Assessing the work environment for creativity, *Academy of Management Journal*, 39, 1154-1184.

Amick, B.C., and Smith,M.J. (1992). Stress, computer-based monitoring and measurement systems: A conceptual overview. *Applied Ergonomics*, 23, 6-16.
Arthur, J. B. (1994). Effects of human resource systems on manufacturing performance and turnover. *Academy of Management Journal*, 37, 670-687.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17, 99-120.

Becker, B. B., & Huselid, M. A. (1998). High performance work systems and firm performance: A synthesis of research and managerial implications. *Research in Personnel and Human Resource Management*, 16, 53-101.

Bontis, N. and Crossan, M. M. (1999). Managing an organizational learning system by aligning stocks and flows of knowledge. Paper presented at the Conference on Organizational Learning: Lancaster, UK, June 6-9.

Boswell, W.R. (2000). *Aligning employees with the organization's strategic objectives: Out of "line of sight", out of mind*. Ithaca, NY: Unpublished Ph.D. dissertation, NYSSILR, Cornell University.

Bouty, I. (2000). Interpersonal and interaction influences on informal resource exchanges between R&D researchers across organizational boundaries. *Academy of Management Journal*, 43, 50-65.

Bowman, E. & Kogut, B. (1995). *Redesigning the firm.* New York: Oxford University Press.

Brews, P. J., and Hunt, M. R. (1999). Learning to plan and planning to learn: Resolving the planning school/learning school debate, *Strategic Management Journal*, 20, 889-913.

Cannella, A.A., Hambrick, D.C. (1993). Effects of executive departure of the performance of acquired firms. *Strategic Management Journal*, 14, 137-152.

Chalykoff, J, and Kochan, T.A. (1989). Computer-aided monitoring: Its influence on employee satisfaction and turnover. *Personnel Psychology*, 40, 807-834.
Chappelow, C. T. (1998). 360-Degree Feedback. In C. D. McCauley, R. S. Moxley and E. VanVelsor, (eds.) *Handbook for Leadership Development* (pp. 29-65). San Francisco: Jossey-Bass.

Clarkson, M. B. E. (1995). A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review,* 20, 92-117.

Dweck, C. S., and Leggett, E. L. (1988). A social-cognitive approach to personality and motivation. *Psychological Review,* 95, 256-273.

Earley, P.C. (1985). Influence of information, choice and task complexity upon goal acceptance, performance, and personal goals. *Journal of Applied Psychology,* 70, 481-491.

Earley, P.C., Connolly, T., and Ekegren, G. (1989). Goals, strategy development and task performance: Some limits on the efficacy of goal setting. *Journal of Applied Psychology,* 74, 24-33.

Earley, P.C., Wojnoraski, P., and Prest, W. (1987). Task planning and energy expended: Exploration of how goals influence performance. *Journal of Applied Psychology,* 72, 107-114.

Freeman, R. E. (1994). *Strategic management: A stakeholder approach.* Boston: Pittman/Ballinger.

Fryzell, G. E., and Wang, J. (1994). The *Fortune* corporation 'reputation' index: Reputation for what? *Journal of Management,* 20, 1-14.

Goldstein, I. L., and Ford, J. K. (2002). *Training in organizations.* Belmont, CA: Wadsworth

Hambrick, D.C., & Cannella, A.A. (1993). Relative standing: A framework for understanding acquired executive departure. *Academy of Management Journal,* 36, 733-762.

Hansen, M. T. Nohria, N. and Tierney, T. (1999). What's your strategy for managing knowledge? *Harvard Business Review,* 77 (March-April), 106-116.

Hesketh, B., and Neal, A. (1999). Technology and Performance. In D. R. Ilgen and E. D. Pulakos (eds.), *The changing nature of performance* (pp. 21-55). San Francisco: Jossey-Bass.

Hitt, M.A., Harrison. J. A. & Ireland, R. D. (2001). *Mergers and acquisitions: A guide to creating value for stakeholders.* New York: Oxford University Press.

Hitt, M. A., Ireland, R, D. & Hoskisson, R. E. (2003). *Strategic management: Competitiveness and globalization.* Cincinnati, OH: Southwestern Publishing Co.

Jackson, S. E. (1996). The consequences of diversity in multidisciplinary teams. In M. A. West (ed.), *Handbook of work group psychology* (pp. 53-76). New York: John Wiley.

Jackson, S. E., and Schuler, R. S. (1995). Human resource management in the context of organizations and their environments. *Annual Review of Psychology,* 46, 237-264.

Jackson, S. E., and Schuler, R. S. (2002). Managing individual performance: A strategic perspective. In S. Sonnentag (ed.), *Psychological management of individual performance* (pp. 371-390). Chichester: John Wiley & Sons.

Kanfer, R., and Ackerman, P.L. (1989). Motivation and cognitive abilities: An integrative/

aptitude-treatment interaction approach to skill acquisition. *Journal of Applied Psychology*, 74,

657-690.

Kluger, A.N., and DeNisi, A.S. (1996). The effects of feedback interventions on

performance: Historical review, meta-analysis, a preliminary feedback intervention theory.

Psychological Bulletin, 119, 254-284.

Latham, G.P. (2000). Motivate employee performance through goal setting. In E.A. Locke (ed.), *Handbook of principles of organizational behavior* (pp. 107-119). Oxford, UK: Blackwell Publishers, Ltd.

Lautenschlager, G.J., and Flaherty, V.L. (1990). Computer administration of questions: More desirable or more social desirability? *Journal of Applied Psychology*, 75, 310-314.

Lei, D. Hitt, M. A. & Bettis, R. A. (1996). Dynamic core competences through meta-learning and strategic context. *Journal of Management*, 22, 549-569.

Levine, J., and Moreland, R. L. (1999). Knowledge transmission in work groups: Helping newcomers to succeed. In L. L. Thompson, J. M. Levine, and D. M. Messick (eds.), *Shared cognition in organizations* (pp. 267-297). Mahwah, NJ: Lawreance Erlbaum.

Liebeskind, J. P., Oliver, A. L., Zucker, L., and Brewer, M. (1996). Social networks, leaming, and flexibility: Sourcing scientific knowledge in new biotechnology firms. *Organization Science*, 7, 428-443.

Locke, E.A., & Latham, G.P. (1990). *A theory of goal setting and work performance.* Englewood Cliffs. NJ: Prentice Hall.

MacDuffie, J. P. and Krafcik, J. (1992). Integrating technology and human resources for high performance manufacturing. In T. Kochan and M. Useem (eds.), *Transforming organizations.* (pp. 210-226). New York: Oxford University Press.

Martin, C.L., and Nagao, D.H. (1989). Some effects of computerized interviewing on job applicant responses. *Journal of Applied Psychology*, 74, 72-80.

Mead, A.D., and Drasgow, F. (1993). Equivalence of computerized and paper-and-pencil cognitive ability tests: A meta-analysis. *Psychological Bulletin*, 114, 449-458.

Meyer, W., and Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology,* 83, 340-363.
Montemayer,E. F. (1996). Congruence between pay policy and competitive strategy in high-performing firms. *Journal of Management,* 22, 889-908.

Mumford, M. and Gustafson, S. (1988). Creativity syndrome, Integration, application, and innovation. *Psychological Bulletin,* 103, 27-43.

Murphy, P. R., and Jackson, S. E. (1999). Managing work role performance: Challenges for twenty-first century organizations and their employees. In D. R. Ilgen and E. D. Pulakos (eds.), *The changing nature of performance* (pp. 325-365). San Francisco: Jossey-Bass.

Porter, M. E. (1985). *Competitive Advantage.* New York: Free Press.

Porter, M. E. (1987). From competitive advantage to corporate strategy. *Harvard Business Review,* 65 (3), 43-59.

The Economist (May 22, 1999). Putting the Bounce Back Into Matsushita, pp. 67-68.

Richard, O. C. (2000). Racial diversity, business strategy, and firm performance: A resource-based view. *Academy of Management Journal*, 43, 164-177.

Scott, W. R. (1987). The adolescence of institutional theory. *Administrative Science Quarterly*, 32, 493 -511.

Schuler, R. S., and Jackson, S. E. (1987). Linking competitive strategies with human resource management practices. *Academy of Management Executive*, 1 (August), 207-219.

Schuler, R. S., and Jackson, S. E. (1999). *Strategic human resource management.* Oxford, UK: Blackwell.

Schuler, R. S., Jackson, S. E., and Storey, J. (2001). HRM and its links with strategic management. In J. Storey (ed.), *Human Resource Management: A Critical Text* (London and Boston: ITP).

Shaw, J. D., Gupta, N. & Delery, J. E. (2002). Pay dispersion and workforce performance: Moderating effects of incentives and interdependence. *Strategic Management Journal,* 23, 491-512.

Sheremata, W. (2000). Centrifugal and centripetal forces in radical new product development under time pressure. *Academy of Management Review*, 25. 389-408.

Smith, K. G. and Di Gregorio, D. (2002). Bisociation, discovery, and the role of entrepreneurial action. In M. A. Hitt, R. D. Ireland, S. M. Camp & D. L. Sexton, (eds.), *Strategic entrepreneurship: Creating a new mindset* (pp. 129-150). Oxford, UK: Blackwell Publishing.

Snell, S. A., Youndt, M. A., and Wright, P. M. (1996). Establishing a framework for research in strategic human resource management: Merging resource theory and organizational learning. *Research in Personnel and Human Resource Management*, 14, 61-90.

Vermeulen, F. & Barkema, H. G. (2001). Learning through acquisitions. *Academy of Management Journal*, 44: 457-476.

Welbourne, T. M., & Andrews, A. O. (1996). Predicting the performance of initial public offerings: Should human resource management be in the equation? *Academy of Management Journal*, 39, 891-191.

Winters, D., and Latham, G.P. (1996). The effect of learning versus outcome goals on a simple versus a complex task. *Group and Organization Management*, 21, 236-250.

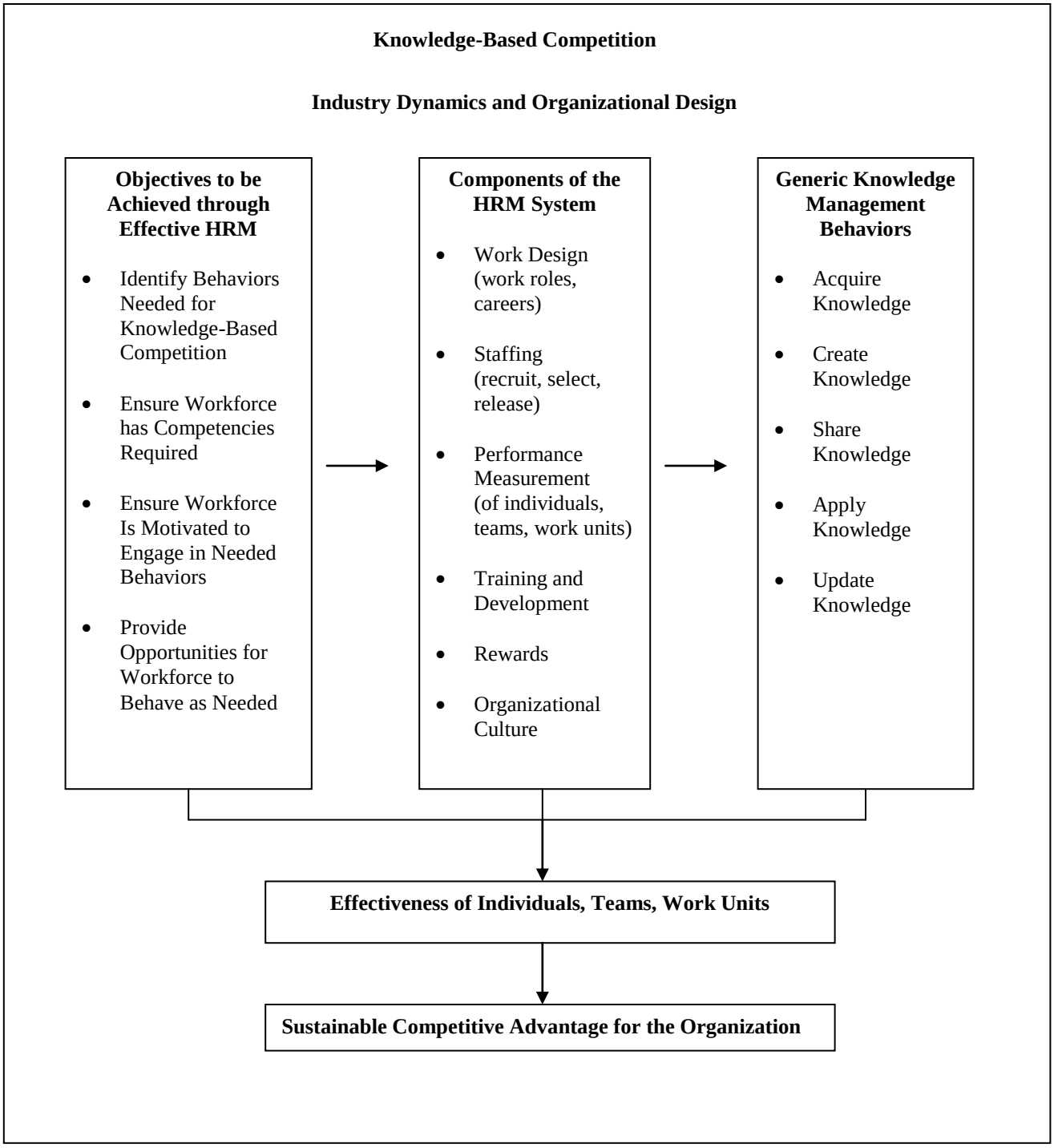
Wright, P. M., and Snell, S. A. (1998). Toward a unifying framework for exploring fit and flexibility in strategic human resource management. *Academy of Management Review,* 23, 765-772.

Zhou, J. (In Press). When the presence of creative coworkers is related to creativity: Role of supervisor close monitoring, developmental feedback, and creative personality. *Journal of Applied Psychology*.

Zhou, J., & George, J.M. (2001). When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, 44, 682-696.

Zucker, L. G. (1987). Institutional theories of organization. *Annual Review of Sociology,* 13, 443-464.

Figure 1


Knowledge-Based Competition
Industry Dynamics and Organizational Design
Objectives to be Achieved through Effective HRM
Identify Behaviors Needed for Knowledge-Based Competition
Ensure Workforce has Competencies Required
Ensure Workforce Is Motivated to Engage in Needed Behaviors
Provide Opportunities for Workforce to Behave as Needed
Components of the HRM System
Work Design (work roles, careers)
Staffing (recruit, select, release)
Performance Measurement (of individuals, teams, work units)
Training and Development
Rewards
Organizational Culture
Generic Knowledge Management Behaviors
Acquire Knowledge
Create Knowledge
Share Knowledge
Apply Knowledge
Update Knowledge
Effectiveness of Individuals, Teams, Work Units
Sustainable Competitive Advantage for the Organization