ACROSS THE GREAT DIVIDE: KNOWLEDGE CREATION AND TRANSFER BETWEEN PRACTITIONERS AND ACADEMICS

SARA L. RYNES
University of Iowa

JEAN M. BARTUNEK
Boston College

RICHARD L. DAFT
Vanderbilt University

Observers have long noted a considerable gap between organizational research findings and management practices. Although volumes have been written about the probable causes and consequences of this gap, surprisingly little empirical evidence exists concerning the various viewpoints. The articles in this forum provide data on the role of academic-practitioner relationships in both generating and disseminating knowledge across boundaries. The contributions of each article are summarized in light of recent theories of knowledge creation, and suggestions are made for increasing the value and relevance of future research to both academics and practitioners.

There is a crisis in the field of organizational science. The principal symptom of this crisis is that as our research methods and techniques have become more sophisticated, they have also become increasingly less useful for solving the practical problems that members of organizations face. (Susman & Evered, 1978: 582)

Each August, we (academics) come to talk with each other; during the rest of the year we read each others' papers in our journals and write our own papers so that we may, in turn, have an audience the following August: an incestuous, closed loop. (Hambrick, 1994: 13)

A substantial body of evidence suggests that executives typically do not turn to academics or academic research findings in developing management strategies and practices (e.g., Abrahamson, 1996; Mowday, 1997; Porter & McKibbon, 1988). Similarly, researchers rarely turn to practitioners for inspiration in setting their research questions (Sackett & Larson, 1990) or for insight in interpreting their results (Rynes, McNatt, & Bretz, 1999). Given this state of affairs, it is hardly surprising that considerable gaps often exist between the normative recommendations of organizational researchers and actual management practices in organizations (e.g., Johns, 1993; Miller, Greenwood, & Hinings, 1997; Pfeffer, 1998).

That there is a wide gap between organizational research and managerial practice is hardly a new observation. Discussions of the causes of this gap—and of potential ways to bridge it—have been widely debated for some time. For example, there have been previous forums on the use of research findings (e.g., Beyer & Trice, 1982) and research relevance (e.g., Aldag, 1997), as well as several books devoted to the topic (e.g., Campbell, Daft, & Hulin, 1982; Hakel, Sorcher, Beer, & Moses, 1982; Lawler, Mohrman, Mohrman, Ledford, & Cummings, 1985; Murphy & Saal, 1990). Moreover, the gap is not restricted to the organizational sciences but, rather, it is found in nearly all fields in which there are both researchers and practitioners (e.g., Glaser, Abelson, & Garrison, 1983; Leontif, 1982; Rogers, 1995). For example, Mosteller (1981) reported that it took nearly 200 years from the time a clear and convincing cure was found for scurvy to the time it was widely adopted by the British navy.

The pervasiveness of the research-practice gap has led thoughtful observers to conclude that its origins are deeply embedded in academics' and practitioners' most basic assumptions and beliefs (e.g., Shrivastava & Mitroff, 1984; Thomas & Tymon, 1982). For example, Shrivastava and Mitroff (1984) suggested that academics and practitioners have fundamentally different frames of reference with respect to such things as the types of information believed to constitute valid bases for action, the ways in which information is ordered and arranged for "sense-making," the past experiences used to evaluate the validity of knowledge claims,

and the metaphors used to symbolically construct the world in meaningful ways. Similarly, others have shown that there are notable differences between academics and practitioners with respect to the goals they seek to influence, the social systems in which they operate, the variables they attempt to manipulate, and acceptable time frames for addressing problems (Johns, 1993; Powell & Owen-Smith, 1998; Thomas & Tymon, 1982).

After reviewing the literature on research utilization prior to 1982, Beyer and Trice concluded that "the most persistent observation . . . is that researchers and users belong to separate communities with very different values and ideologies and that these differences impede utilization" (1982: 608). Thus, despite longstanding concerns about the limited research-practice interface (e.g., Campbell et al., 1982; Susman & Evered, 1978), many observers are skeptical about whether closer relationships are possible (e.g., Cummings, 1990; Garland, 1999; Hakel, 1994; Oviatt & Miller, 1989) or even desirable (e.g., Earley, 1999; Fagenson-Eland, 1999; Gillespie, 1991).

SPECIAL RESEARCH FORUM: KNOWLEDGE TRANSFER BETWEEN ACADEMICS AND PRACTITIONERS

Against this backdrop, one might wonder about the usefulness of exploring, yet again, the topic of knowledge transfer between academics and practitioners. However, we believe the issue is ripe for reexamination for at least two reasons.

First, economic and political conditions have been changing in ways that have made both academics and practitioners potentially more receptive to allying with and learning from one another (e.g., Burack, 1999; Rynes & Trank, 1999; Slaughter & Leslie, 1997). Second, although many claims continue to be made about the nature of the academic-practitioner interface (e.g., Larwood & Gattiker, 1999), the vast majority are based on personal predilections and anecdotal evidence rather than on solid empirical data.

Environmental Changes

Changes in economic and political conditions have substantially altered the climate for collaboration between academics and practitioners. On the practitioner side, intensified competition in worldwide markets has increased organizational performance pressures and made practitioners more receptive to any ideas—academic or otherwise—that might make them and their organizations more effective (Abrahamson, 1996; Micklethwait & Wooldridge, 1996; Pfeffer & Sutton, 2000). Additionally,

many organizations have downsized their corporate research staffs, creating a void that is increasingly filled by academic and government researchers (Cohen, Florida, Randazzese, & Walsh, 1998; Powell & Owen-Smith, 1998). To meet the challenge of global competitiveness, public policy has also changed in ways that encourage industry-academic cooperation, such as providing tax breaks for corporate funding of university research and developing funding programs that require industry-university collaboration as a condition of funding (Cohen et al., 1998).

Taken together, these developments have resulted in practitioners becoming more heavily involved in academia and academic research. This involvement has taken the form of increased donations to higher education, expanded participation in academic advisory boards, increased recruitment of academic researchers by private industry, participation in university-industry research consortia (UIRCs), and location of corporate research and development centers near major universities (e.g., Burack, 1999; Slaughter & Leslie, 1997; Stross, 1997). According to Powell and Owen-Smith (1998), corporations that have the strongest networks with university researchers and the strongest internal capacity for identifying and evaluating scientific research will be in the best position to solve the really important problems that impede further progress.

On the academic side, dramatic changes in resource dependencies have increased higher education's reliance on the private sector for both research and teaching support. Public funding for higher education as a percentage of total revenues and federal research support per academic researcher have both been declining for more than two decades (Cohen et al., 1988; National Center for Education Statistics, 1997). Additionally, corporate and for-profit universities are beginning to emerge as serious competitors to higher education (Meister, 1998; Mowday, 1997), just as consulting firms are emerging as competitors to university researchers (e.g., Abrahamson, 1996; Huey, 1993; Micklethwait & Wooldridge, 1996). These changes, which have been observed in several countries (Slaughter & Leslie, 1997), have made universities increasingly dependent on private funds at a time when competition for those funds has been intensifying (Cohen et al., 1998; Hambrick, 1994).

At the same time that universities have become more dependent on alternative forms of support, public policy has also increased the incentives for universities (and individual faculty members) to produce knowledge that has commercial value (Powell & Owen-Smith, 1998; Press & Washburn,

2000). For example, the 1980 Patent and Trade Amendments (commonly known as the Bayh-Dole Act) allowed universities to retain the property rights to scientific inventions, a development that has led to a blurring between the traditionally distinct roles of academia and industry (Powell & Owen-Smith, 1998; Slaughter & Leslie, 1997).

There is considerable evidence that academics have responded in ways consistent with these changing opportunities and dependencies. For example, since the passage of Bayh-Dole, there has been dramatic growth in the number of formal university-industry research partnerships, both in the organizational studies area (e.g., Burack, 1999; Lawler et al., 1985) and in academia more generally (Cyert & Goodman, 1997). Cohen, Florida, and Goe (1994) reported that in 1990, more than a thousand UIRCs spent approximately $4.12 billion on cooperative research—a figure more than twice the amount provided by the National Science Foundation. Moreover, the initiative for the vast majority of these centers (73%) came from universities rather than industry, and most (61% versus 12%) were initiated by individual faculty members or departments rather than by university administrators (Cohen et al., 1998). Thus, the growing desire of many academics to interact with practitioners seems clear.

Claims in Search of Evidence

The second factor that argues for reexamining knowledge transfer between academics and practitioners is the paucity of empirical work on the topic, particularly in the organizational sciences. Although many volumes now exist that describe the gap between organizational science and practice (e.g., Hakel et al., 1982; Larwood & Gattiker, 1999; Lawler et al., 1985; Murphy & Saal, 1990), the vast majority of this work has been in the form of personal reflections and speculation (Campbell et al. [1982] is an exception). The nonempirical nature of previous discourse in the organizational sciences has resulted in widely varying views of academic-practitioner collaborations (for one view, see, for example, Burack [1999], Hakel et al. [1982], Susman and Evered [1978], and Wright [1999]; for a contrasting view, see Earley [1999], Gillespie [1991], and Fagenson-Eland [1999]), with little empirical basis for sorting the various claims.

For example, academics are deeply split as to whether they see research collaboration with practitioners as having primarily positive or primarily negative effects on the advancement of science. On the positive side, some have argued that practitioners can be excellent sources of important and

stimulating problems and that their unique insights, when combined with those from an academic perspective, can stimulate important new scientific discoveries (e.g., Boehm, 1980; Campbell et al., 1982; Dunnette, 1990; McCall & Bobko, 1990). Indeed, Betz (1996) and Powell and Owen-Smith (1998) argued that practitioners are most likely to seek alliances with outside researchers when they face the most difficult and important scientific problems, because of the difficulty of solving such problems by themselves. In addition, pursuing joint research in organizational settings lends itself to examination of important variables that are difficult to simulate or manipulate in other types of research (e.g., Hackman, 1985).

On the negative side, many worry that collaborating with practitioners may mean that only narrow, short-term, or commercially profitable projects will be pursued (e.g., Murphy & Saal, 1990) or that managerial interests will be pursued at the expense of employees or the broader society (Fagenson-Eland, 1999). Other concerns are that scientific progress will be stymied by corporate restrictions on data collection, interpretation, and dissemination (e.g., Cohen et al., 1998), or by the difficulties of meeting the conventional requirements of normal, positivist science in organizational settings (e.g., Cook & Campbell, 1979). Finally, some worry about the ease with which researchers can be subtly (e.g., Beyer & Trice, 1982; Gillespie, 1991) or not so subtly (e.g., Press & Washburn, 2000) co-opted by corporate interests and incentives.

The ability to choose among these claims is limited, first, by the paucity of empirical evidence and second, by partially conflicting results among the studies that do exist. For example, with respect to whether academic-practitioner collaboration tends to be associated with more (or less) important research problems, Campbell and colleagues (1982) found some evidence for both propositions. Specifically, although a relatively large proportion of studies that researchers identified as their "most significant" resulted from academic-practitioner collaborations, so did a relatively large percentage of their "least significant" studies (for instance, outgrowths of consulting projects were often identified as such).

Similarly, Rynes and colleagues (1999) also reported somewhat mixed results. On the positive side, they found that researchers who spent more time at organizational research sites reported greater personal learning than those who spent less time, and also that the resultant research was cited more heavily by other researchers. On the other

side, they found a negative relationship between practitioner involvement in formulating the research question and subsequent citations by other researchers. Thus, at least in terms of citation rates (which are admittedly more academic- than practitioner-oriented), the best results seemed to be attained when academics posed their own questions but then immersed themselves in organizations during the process of investigation.

Moving outside of the organizational sciences, Louis, Blumenthal, Gluck, and Stoto (1989) and Cohen and coauthors (1998) reported that the most successful academic researchers in the biological and physical sciences also tend to have the highest levels of interaction with practitioners. Similarly, Pelz and Andrews (1976) found that corporate researchers who spent at least part of their time working on assigned (rather than self-chosen) problems and who took boundary-spanning roles (in management, for example) in addition to conducting research were also the most productive. Thus, a preponderance of the evidence suggests that collaborations between researchers and practitioners increase research productivity and, in some cases, quality as well. However, the latter variable seems to depend on the specifics of the collaboration.

With respect to whether or not practitioners place limits on scientific inquiry or dissemination, Rynes and her coauthors (1999) found little evidence of such problems among the organizational scientists they studied. However, an important limitation of their sample was that they inquired only about studies that had successfully made it through the top-tier publication review process. Moreover, evidence from the life sciences, where commercialization is generally a much more immediate prospect than it is in the organizational sciences, suggests that organizations are increasingly constraining the dissemination of results obtained through private funding (Cohen et al., 1998; Press & Washburn, 2000). However, these results might not apply to the organizational sciences (Powell & Owen-Smith, 1998), since commercialization potential and implementation success are far less certain than in the physical sciences (Barney, 1991; Pfeffer & Sutton, 2000).

Given the potential for both positive and negative outcomes from collaborative research, there is a need for additional evidence that can create a more sophisticated picture of the science-practice relationship. We turn now to a description of the types of evidence submitted to this special research forum.

THE ARTICLES

Forty-nine manuscripts were submitted to this forum. Of these, 24 were returned without review, 16 were rejected on first review, 5 were rejected after revision and resubmission, and 5 were accepted for publication. Characteristics of the submissions are listed in Table 1.

Perhaps the most notable characteristic of the submitted manuscripts is the large number that were returned without review. The most common reason for not reviewing articles was that they did not contain any data, as required by *AMJ*'s mission statement and guidelines for contributors. Thus, the previously noted tendency for academics to express opinions about academic-practitioner relations in the absence of data characterized many submissions to the present forum as well. After eliminating articles that were not reviewed, the most common reasons for rejection were construct validity problems (77%), mismatches between theory and methods (46%), and weak or nonexistent theory (37%).

Another interesting set of findings concerns the extent to which the articles themselves appear to reflect collaboration between academics and practitioners. Coding revealed that fewer than 20 percent of the studies involved practitioners in their initial designs or engaged them as coauthors after the studies had been completed. On the other hand, 53 percent of the authors had direct contact with practitioners during the course of their studies, and approximately three-fifths of the articles stressed that academics and practitioners could learn from each other (as opposed to assuming that academics were the more knowledgeable group and that the problem of transfer runs only in one direction). Finally, various forms of collaboration tended to be highly correlated; for example, involving practitioners in the initial stages of the design and having a practitioner coauthor had a correlation of .73.

Finally, we analyzed whether there were any detectable relationships between article characteristics and editorial decisions (such as reject, revise and resubmit, and accept after revision). This analysis revealed that articles were more likely to be accepted if both academics and practitioners provided data for the study ($r = .32$) and if the authors assumed that knowledge transfer was a two-way street, rather than a unidirectional process in which knowledge flows from academics to practitioners ($r = .45$). In fact, these two characteristics were evident in four of the five articles eventually accepted for publication, as described below.

In the first article, "Doing Research That Is Useful

TABLE 1
Characteristics of Submitted Articles

Characteristic	Percentage of Articles	Characteristic	Percentage of Articles
Editorial decision		Assumptions about who holds useful knowledge	
No review	47	Practitioners alone	6
Initial rejection	33	Academics alone	22
Resubmission rejection	10	Both academics and practitioners	61
Acceptance	10		
Methodology		Reasons for rejection[a]	
Survey	33	Construct validity problems	41
Interviews	20	No data	37
Case study	18	Inappropriate modeling	33
Personal reflection	18	Insufficient detail regarding methods	33
Archival	10	No incremental contribution	31
		Weak or inappropriate sample	29
		Didn't fit forum	24
		Front end–back end mismatch	24
		Weak or no theory	20
Unit of analysis			
Individual	45		
Organization or work unit	18		
Project	14		
Practitioner coauthor	16		
Practitioner involvement in study design	14		
Face-to-face contact with practitioners	53		
Topic			
Knowledge creation	36		
Knowledge diffusion	57		
Studied both academics and practitioners	33		

[a] Multiple categories possible.

to Practice: A Model and Empirical Exploration," Susan Mohrman, Cristina Gibson, and Allan Mohrman examine the factors associated with practitioner evaluations of research usefulness in a multiorganization research project. Because the participating organizations displayed different degrees of involvement with the research, the researchers were able to assess the extent to which three hypothesized factors—joint interpretive forums, perspective taking, and impact of the research on organizational change decisions—were associated with practitioner perceptions of research usefulness. More than anything else, their results stress the heavily social nature of the knowledge transfer process.

In "The Science and Practice of Team Development: Improving the Link," Lynn Offermann and Rebecca Spiros report their survey of 245 team developers (59 percent of whom were practitioners and 41 percent of whom were academics) from the Organizational Development and Change Division of the Academy of Management. The researchers' objectives were to determine the current state of team development practice, the research needs of team development practitioners, and ways to improve the link between the science and practice of team development. Their results reveal a number of causes for optimism about the flow of knowledge between academics and practitioners, as well as some areas for concern.

In "Knowledge Representations and Knowledge Transfer," Richard Boland, Jagdip Singh, Paul Salipante, John Aram, Sharon Fay, and Prasert Kanawattanachai draw upon theories of cognition and learning to test whether managers exposed to three different forms of knowledge representation— interpretive, abstract, and particular—subsequently display different decision-making processes and outcomes. They hypothesized that these three different ways of presenting knowledge would activate different types of information-

processing schemata, which in turn would lead to different decision patterns on a task. Although different decision patterns indeed emerged, they were not all in the directions predicted by the hypotheses.

In "Academic-Practitioner Collaboration in Management Research: A Case of Cross-Profession Collaboration," Teresa Amabile, Chelley Patterson, Jennifer Mueller, Tom Wojcik, Paul Odomirok, Mel Marsh, and Steven Kramer present a case study of a three-year collaborative research venture involving academics and practitioners from several universities and business organizations. The authors used a variety of data sources (e-mail archives, surveys, minutes of meetings, and participant observations) to create a preliminary model of success determinants in cross-profession collaborations, which they define as "collaborations between individuals from different professions and organizations who come together primarily as individuals rather than as organizational representatives to accomplish a particular work project." The model that ultimately emerges reflects a combination of earlier models of interorganizational collaboration (e.g., Dyer & Singh, 1998; Gray & Wood, 1997) and individual collaboration within organizations (e.g., Tjosvold, 1986).

In "How Relevant Is University-Based Scientific Research to Private High-Technology Firms?" Jennifer Spencer examines the extent to which U.S. and Japanese corporate researchers in the flat panel display (FPD) industry cited both academic and corporate research in the precommercialization stages of FPD technology. In addition, she looks at the extent to which published research relevant to this topic has diffused across international boundaries. Her results point to the potential importance of cross-cultural and institutional differences (such as those created by Bayh-Dole), as well as the importance, if knowledge transfer to nonacademics is to occur, of publishing in practitioner journals.

CONTRIBUTIONS TO KNOWLEDGE

With the exception of those by Amabile and Mohrman and their respective coauthors, the articles in this forum do not have many obvious similarities. Methodologically, there are two case studies, one experiment, one survey, and one archival analysis. The dependent variables of interest include perceived research usefulness (Mohrman et al., 2001; Offermann & Spiros, 2001); transfer of knowledge to a decision task (Boland et al., 2001); research citations (Spencer, 2001); and goal achievement, team functioning, and team member outcomes (Amabile et al., 2001). Also, as is typical

of much research in this area, three of the five articles (Amabile et al., Boland et al., and Mohrman et al.) report research with small samples.

The articles contribute to understanding of both the creation and diffusion of knowledge, two crucial underlying processes for knowledge transfer (Choo, 1998; Knott & McKelvey, 1999; Nonaka & Takeuchi, 1996). Of the forum articles, the one by Amabile and her colleagues deals most directly with issues related to joint academic-practitioner knowledge creation. Amabile and her colleagues suggest a number of ways in which the eventual quality of research is likely to be enhanced by practitioner participation. In the study they describe, practitioners contributed directly to research quality by generating additional study participants, facilitating high response rates, and contributing to improved content-coding schemes.

However, practitioners also contributed to research quality in more subtle ways as well. For example, by challenging the lead researcher's tendency to interpret results primarily in light of previous theory, practitioners provided the kind of alternative interpretations that often lead to new theoretical breakthroughs or syntheses (e.g., Bartunek, 1988; Bartunek & Louis, 1996; Daft, Griffin, & Yates, 1987; McCall & Bobko, 1990; Weick, 1989). Second, by pressing for greater participation, practitioners exposed the academics' tacit assumptions about how the project was "supposed" to operate and thus opened the way for more diverse contributions by a larger number of people. Finally, by pressing for preliminary results early in the research process, practitioners appear to have facilitated a variant of fast prototyping. Although the benefits of prototyping have not yet been tested against other methods in organizational science research, these processes have been found to produce better solutions than linear sequential methods in product development settings (Eisenhardt & Tabrizi, 1995).

The processes described by Amabile et al. (and to some extent by Mohrman and her coauthors) also highlight the importance of good social relations between academics and practitioners for successful knowledge creation. For example, Jehn, Northcraft, and Neale (1999) showed that the benefits of knowledge diversity can be derailed if they become overshadowed by process or values conflicts. Thus, both Amabile et al. and Mohrman et al. paid a great deal of attention to team- and trust-building activities, such as frequent e-mail and face-to-face interactions, joint sense-making sessions, procedural restructurings, and conflict resolution procedures.

With the exception of Amabile and colleagues' work, the articles here focus primarily on knowl-

edge diffusion. One of the most persistent findings from previous research is that the adoption of new knowledge tends to be a slow process, even under highly favorable circumstances. For example, transfer of knowledge has been shown to fail even when there is strong evidence of its superiority over prior understandings, when those transmitting and receiving the new knowledge are from the same organization, and when the target for the knowledge has great need of a solution and may even have commissioned a search for alternatives (e.g., Argyris, 1996; Corwin & Louis, 1982; Dougherty, 1992; Glaser et al., 1983; Mosteller, 1981; Rogers, 1995). Given the difficulties of knowledge transfer even under highly favorable conditions, it is hardly surprising that such different groups as academics and practitioners often experience difficulties in learning from one another.

The articles in this forum provide some clues regarding barriers to dissemination, as well as some potential solutions. For example, both Spencer and Offermann and Spiros show that knowledge transfer can be impeded by the choices that academics make about where to publish their research. As have previous researchers (e.g., Terpstra & Rozell, 1997a), Offermann and Spiros found that many practitioners—even those with doctoral degrees— stop reading academic journals once they enter the world of practice. (Indeed, even academics often turn more to the practitioner literature for guidance when they take administrative positions in universities Argyris [1996]). Still, Spencer found that when university scientists published their work in journals read by practitioners, their research was nearly as influential as the research published by practitioners, at least in the United States (but not in Japan).

In addition to impediments that follow from decisions about where to disseminate academic findings, there are also issues of how academics communicate when they do try to reach practitioners. In particular, the studies by Boland, Mohrman, and their respective coauthors suggest that the typical way of presenting academic information (through objective, declarative knowledge) is a relatively ineffective way of getting knowledge to "take" in practitioner settings (see also Perrow [1983] and Van de Vall, Bolas, and Kang [1976]). Taken together, the Boland et al. and Mohrman et al. articles suggest that practitioners are either less motivated, or less able, to process written, declarative information than information presented in other ways. As one participant in Morhman and colleagues' research put it, "When we went over the data, it really, really helped to have the researcher interpret the results . . . if you just gave that output to

people to read, they wouldn't . . . with interpretation of the data and a summary and then a discussion of the data and its relevance, that's really where it's at."

The preceding quote also illustrates the strong advantages of face-to-face interaction for knowledge transfer between groups with widely differing perspectives. Such interaction appears to be crucial for developing many types of shared knowledge. However, because face-to-face interactions are a very time-intensive way of transmitting knowledge, most dissemination of academic research takes place through a variety of intermediaries. Indeed, Abrahamson noted that "entire industries often stand between the creators of innovations and the masses who use them" (1996: 263). Thus, academics who are interested in disseminating research to those who might use it will generally have to find ways to both motivate and enable practitioners to process and use academic findings, even those with direct implications for practice (Argyris, 1985; Conger, 1998; Petty & Cacioppo, 1996; Rynes & Trank, 1999). Boland and colleagues (2001) suggest two methods of presentation—interpretive and particularistic—that may motivate more active information processing among nonacademics, and Choo (1998) and Conger (1998) have suggested others.

Finally, Offermann and Spiros report that there is a sense among those engaged in organizational development that academic research is behind, rather than ahead of, organizational practice. Although this perception might reflect little more than a self-serving bias among practitioners, there is other evidence to suggest that this observation may well be valid (Galbraith, 1980). For example, Barley, Meyer, and Gash (1988) used text analysis to show that academics tended to follow, rather than lead, practitioners with respect to thinking and discourse about organizational cultures. Similarly, others have found that researchers followed practitioners with respect to quality circles and quality management (Abrahamson & Fairchild, 1999; Dean & Bowen, 1994). Given these findings, it is interesting that so much attention has been focused on the benefits of research diffusion to practitioners and their organizations (Gannon, 1983; Terpstra & Rozell, 1987b), but so little has been focused on the potential benefits of practical knowledge for researchers and for the advancement of science.

WHAT NEXT?

Previous research suggests that the quality and rate of knowledge creation are enhanced by various forms of creative tension—tensions between different disciplines (Bylinsky, 1990) or types of knowl-

edge (Jehn et al., 1999), between competing hypotheses (Platt, 1964; Latham, Erez, & Locke, 1988), between cognition and action (Connolly, 1982), between plans and prototypes (Eisenhardt & Tabrizi, 1995), between thinking and writing or speaking (Weick, 1979), and between theory and implementation (Lewin, 1946; Susman & Evered, 1978). These dialectics suggest that the rate of knowledge creation, dissemination, and utilization can be increased through deliberate institutional strategies and tactics (e.g., Choo, 1998; Leonard-Barton, 1995; Stewart, 1997). In this final section, we discuss how organizational scientists and practitioners might develop a strategy to increase the pace and quality of knowledge creation and dissemination through collaborative efforts.

Recently, Nonaka and colleagues (1994; Nonaka & Konno, 1998; Nonaka & Takeuchi, 1995) developed a theory of knowledge creation that is consistent with the view that significant knowledge emerges from the combination of disparate perspectives. Nonaka and colleagues proposed that there are basically two kinds of knowledge, tacit and explicit. *Tacit knowledge* is personal, context-specific knowledge that is difficult to formalize and communicate. It includes cognitive patterning (such as mental models and schemata), technical knowledge (concrete, skill-related know-how) and subjective insights (hunches). In contrast, explicit or codified knowledge is transmittable in formal, systematic language expressed in symbols, words, and/or numbers.

In Nonaka and Takeuchi's (1995) model and in other similar models (e.g., Choo, 1998; Leonard-Barton, 1995), new knowledge is seen as being created most rapidly when there is continual cycling from one form of knowledge conversion to another—from tacit to explicit and from explicit to tacit. Beginning with the individual but then moving on to higher levels, they hypothesized that a "knowledge spiral" is created through four interactive methods of knowledge conversion: *socialization* (tacit to tacit), *externalization* (tacit to explicit), *combination* (explicit to explicit) and *internalization* (explicit to tacit). Table 2 illuminates these four processes in the context of some of the articles in this forum, as well as in the broader context of academic-practitioner knowledge creation and dissemination.

In socialization, tacit knowledge is exchanged through joint activities, such as individuals' spending time together or learning together, in order to produce some form of shared mental model, metaphor, analogy, or culture that can then serve as a framework for moving forward. Successful socialization requires that individuals empathize with one another enough to incorporate others' feelings and beliefs, so that a larger sense of situation and possibility can emerge (Nonaka & Konno, 1998). Because socialization involves acceptance of the beliefs, feelings, and emotions of others, it is very difficult to achieve without some form of shared face-to-face experience.

The importance of socialization processes for moving forward to other forms of knowledge conversion is illustrated in both the Amabile et al. and Mohrman et al. articles. In Amabile and her colleagues' work, frequent face-to-face and e-mail sessions were used to create systems that enabled im-

TABLE 2
Types of Knowledge Conversion that Speed Knowledge Creation[a]

Knowledge Conversion Process	Examples from This Forum	Broader Examples from Academic-Practitioner Interactions
Socialization Tacit-to-tacit knowledge	Mohrman Joint interpretive forums; perspective taking	Joint symposia at professional meetings Consulting relationships Academic advisory councils Executives in residence Sabbaticals in industry
Externalization Tacit-to-explicit knowledge	Amabile Practitioners make academics aware of their tacit assumptions	Grounded theory Protocol analysis Ethnography Action research
Combination Explicit-to-explicit knowledge	Spencer Researchers cite other researchers	Joint academic-practitioner creation of learning maps from academic research Joint academic-practitioner research teams
Internalization Explicit-to-tacit knowledge	Boland Interpretive knowledge presentation produces better decision making	Training with distributed practice Action research

[a] Adapted from Nonaka and Takeuchi (1995).

proved data collection and interpretation processes, and in Mohrman and colleagues' work, early perspective taking and joint sense-making sessions increased the perceived usefulness of the research that eventually emerged. More generally, academics and practitioners can share and convert tacit knowledge through joint symposia (such as those held at Academy of Management meetings), consulting relationships, academic advisory councils, and "key school" recruiting relationships.

Externalization is the process by which tacit knowledge is made explicit. In externalization, intuitions or images are converted into tangible statements, metaphors, analogies, hypotheses, or models (Nonaka & Takeuchi, 1995: 64). A good example of externalization is provided by Amabile and co-authors (2001), who describe how challenges from practitioners made academics aware of their preconceived notions with respect to both research process and substance. More broadly, tacit assumptions of practitioners can be made explicit through interaction with academics employing case analysis, grounded theory, or protocol analysis. Alternatively, tacit assumptions of researchers can be brought into sharp relief during the process of conducting ethnographic research.

In combination, explicit knowledge from different disciplines, functional areas, or perspectives is analyzed for commonalities and discrepancies in order to produce a new synthesis. Combinations of explicit knowledge comprise the vast majority of contributions to scientific journals (Daft & Lewin, 1990; Sackett & Larson, 1990), although most such combinations appear to device solely from the academic knowledge base rather than from a combination of academic and practitioner knowledge (Rynes & McNatt, in press; Sackett & Larson, 1990). Academics also transmit explicit information to practitioners through books and publications in practitioner journals (Pfeffer & Sutton, 2000; Spencer, 2001), but most of this output does not reflect new knowledge in the sense defined by Nonaka, as it does not represent a synthesis of academic and practitioner knowledge but rather a simple translation of academic findings to presumed practitioner language and format. Perhaps the failure to truly integrate practitioner and academic perspectives is what causes this form of knowledge transfer to be generally ineffective (Boland et al., 2001; Conger, 1998; Offermann & Spiros, 2001; Terpstra & Rozell, 1997a).

In internalization, explicit knowledge is converted to tacit knowledge through learning by doing. The Boland et al. article in this forum suggests ways of transmitting knowledge—through interpretive or particularistic frameworks—that may be more likely to accomplish that goal than the typical journal article. More generally, there are a variety of ways in which academics and practitioners might internalize knowledge across boundaries. For example, action research presents opportunities for both academics and practitioners to add to their tacit knowledge bases through implementation and subsequent modification of academic theories. Additional knowledge creation and use can then be further accelerated by embodying the newly combined knowledge into some form of summary model, tool, or framework.

According to Nonaka and colleagues, knowledge creation increases in greater-than-additive fashion when all four forms of knowledge conversion are actively pursued and reflected against each other: "The key to knowledge creation lies in the mobilization and conversion of tacit knowledge . . . a spiral emerges when the interaction between tacit and explicit knowledge is elevated dynamically from a lower ontological level (e.g., the individual) to higher levels" (Nonaka & Takeuchi, 1995: 56–67). This framework generates a number of insights that help explain why the knowledge gap between academics and practitioners remains so persistent. For example, according to the theory, the root of all knowledge creation is the mobilization of *tacit* knowledge. However, the most elite organizational science journals are heavily dominated by explicit-to-explicit knowledge conversion, which is the form least directly associated with tacit knowledge. In addition, the vast majority of this research is based on knowledge conversion within the bounds of the academic community, rather than across academic-practitioner boundaries (Rynes & McNatt, in press). In addition, surveys of researchers (e.g., Campbell et al., 1982) and empirical coding of journal articles (e.g., Sackett & Larson, 1990) both suggest that the vast majority of ostensibly combination-based research actually consists of very modest extensions of previous research, rather than truly new combinations.

Second, Nonaka et al. suggest that unless successful socialization occurs between academics and practitioners—with each side truly understanding and empathizing with the other—attempts to transfer explicit knowledge across boundaries are likely to fall on deaf ears (see also Glaser et al. [1983] and Rogers [1995]). In the absence of effective intergroup socialization, the independent social identities of academics and practitioners are likely to solidify (Ashforth & Mael, 1991), with accompanying increases in in-group/out-group thinking reducing the motivation for each side to learn from the other (Weick, 1996).

Third, Nonaka and his colleagues suggest that all

knowledge creation begins with individuals and then moves up to progressively higher levels. However, empirical examination of our scientific literature has shown that case studies, reflective essays, and inductive theory building have become increasingly disadvantaged in organizational science journals over the years (Daft, 1980; Dunbar, 1983; Locke & Cooper, 2000). And yet, as Boland and his coauthors demonstrate in this volume, these are the types of research that are most likely to resonate with practitioners (see also Beyer and Trice [1982] and Dunbar [1983]), perhaps because they emerge through socialization and have as one of their goals the externalization of assumptions, norms, and practices (that is, tacit knowledge).

Nonaka et al.'s framework not only sheds light on reasons for the continuing academic-practice gap; it also suggests that current academic knowledge generation processes are likely to be suboptima even when viewed from a purely academic perspective. Setting aside the issue of whether or not knowledge is crossing academic-practitioner boundaries, it has been noted that there are also relatively few visible instances of socialization, externalization, and internalization within the academic community (Argyris, 1996; Weick, 1996). For example, there has been a general decrease in the number of personal reflections by academics (externalization) appearing in top-tier journals (Van Maanen, 1998), and few cases in which researchers with competing ideas get to the bottom of their competitors' assumptions (socialization) so that truly new combinations of knowledge can occur (Argyris, 1996; Tannen, 2000; but see Latham et al. [1988] for an exception).

In light of these observations, we make four general suggestions that we hope will help guide academics who wish to both serve and learn from organizations and will also increase the relevance and value of published research for both practitioners and academics. First, we urge researchers to seek, rather than avoid, the tensions inherent in academic-practitioner interactions. Because many of the kinds of tensions that have been found to enhance knowledge creation also tend to characterize academic-practitioner interactions (for example, the emphasis placed on thought versus action, particularism versus generalization, tacit knowledge versus explicit knowledge, and problem solving versus theory building), higher levels of direct contact with practitioners should improve the quality of academic research. Thus, we echo the advice offered by Campbell, Daft, and Hulin nearly two decades ago:

> Significant research is an outcome of investigator involvement in the physical and social world of organizations. The implications for scholars are clear: Make contacts. Leave your office door open. Look for wide exposure and diverse experiences. Go into organizations . . . . Listen to managers. Activity and exposure are important because significant research often results from the chance convergence of ideas and activities from several sources. (1982: 107)

Second, we encourage officers of professional associations to continue recent trends toward increased interaction between academics and practitioners by themselves facilitating such interaction. The Academy of Management, for example, has recently expanded the Practitioner Series at its annual meetings and offered fellowships to those who use service-learning projects in their classrooms or who conduct original research on service-learning or community engagement projects. Nonaka's theory of knowledge creation, as well as the Amabile et al. and Mohrman et al. articles in this volume, stress that good social relations, mutual empathy, and some sort of common ground are prerequisites for achieving optimal outcomes in cross-boundary knowledge creation (see Bartunek & Louis, 1996; Easterby-Smith & Malina, 1999; Rogers, 1995). Additionally, Mohrman and her colleagues emphasize the importance of face-to-face interactions for disseminating, as well as creating, knowledge.

Because knowledge transfer is fundamentally a social process (Rogers, 1995), the power of increased interaction between academics and practitioners for generating new knowledge should not be underestimated, even when such interactions are not explicitly research-oriented (Dunnette, 1990). However, we suggest that the format of new interactions be designed with practitioners not just in mind, but also in attendance.

Third, because the current composition of elite organizational science journals is heavily skewed toward combinations of explicit knowledge derived almost entirely from the academic community, we recommend that journal editors make conscious attempts to solicit and provide more room for articles reflecting the full range of knowledge creation techniques—socialization (for instance, ethnographies), externalization (reflective essays, grounded theory), and internalization (action research). Without system support at higher institutional levels, individual researchers (as well as those who advise them) will continue to be risk-averse about broadening their research paradigms to include forms of knowledge creation other than combination.

In making this recommendation, we recognize that the power of journal editors to influence what gets published is limited by a number of factors, including the types of manuscripts that individual researchers choose to submit (e.g., Campbell,

1982). Still, we believe that editors can nudge research in desired directions through such actions as editorial policy statements, selection of editorial board members, special research forums, and the types of advice given to authors in editorial decision letters regarding how to improve their research. In fact, these processes are already occurring to some extent. For example, Van Maanen (1998) found a slight upward trend for various forms of qualitative research in *Administrative Science Quarterly* in recent years. In addition, the numbers of special forums (which tend to be more flexible in terms of paradigmatic approaches) have increased in many journals, including those published by the Academy of Management. We applaud these developments and encourage additional ones in the future (for instance, awards for articles with the greatest implications for practice).

Fourth, we encourage the gatekeepers of scientific journals to move toward broadening both the language and the rhetorical strategies used in organizational science discourse. The increasing specialization of scientific language and its negative implications for cross-boundary fertilization of knowledge are well known (Daft, 1980; Hayes, 1992; McCloskey, 1994). Specialized language raises the costs of becoming an expert in any given field and thus reduces the likelihood that scientists will be capable of combining knowledge from different disciplines, or that practitioners will combine their own knowledge with that of academics (Hakel, 1994; Offermann & Spiros, 2001).

Although specialization of language is widely recognized as an impediment to knowledge transfer across boundaries, two equal if not greater dangers come from the limited range of rhetorical strategies employed in scientific discourse (Locke & Golden-Biddle, 1987; McCloskey, 1994). The first of these is that conventional scientific discourse tends to obscure the actual processes of knowledge creation. For example, Locke and Cooper (2000) argued that authors are typically required to force-fit their research into prior theoretical frameworks regardless of whether or not they provide the best fit to the data. Sutton and Staw (1996) discussed how authors' expositions of their methods often bear little resemblance to the actual processes that got them to the final product, and Boehm (1980) noted that researchers working inside organizations often feel pressure to "twist" their designs away from what would be most useful in an organizational context toward something more likely to be acceptable to journal reviewers.

In their intensive analysis of significant versus not-so-significant research projects, Daft and his coauthors (1987) concluded that there was a duality or paradox associated with the most significant research projects. Specifically, significant projects often began in an organic, messy, "fuzzy" state but ended with something clear, tangible, and well understood (Daft et al., 1987: 783). The transformation from fuzziness to clarity tended to require "intense effort and resolve, rigor and clear thinking," yet most of that process is excised from public access during the publication process. As if to underscore Daft et al.'s point, the current editor of the *Journal of Applied Psychology* has recommended that authors limit their discussion sections to four pages or less, because "in a good paper, you already know what it means" (Murphy, 1996: 133). What is excised from the final manuscript is much of the process that unearthed the meaning, as well as many of the alternative ideas that were considered and discarded.

The second danger of conventional rhetorical strategies is that they also tend to suppress the assumptions, norms, and values that underlie the research. As Argyris (1996) and McCloskey (1985, 1994) noted, some of the most fundamental assumptions of scientific disciplines have become so taken-for-granted that they no longer come under discussion in public forums. As a result, many of the most fundamental discussions among academics tend to take place "in the dark of the night" (McCloskey, 1985). Argyris (1996) argued that keeping such discussions private impedes knowledge creation by inhibiting combination. However, assumptions and premises that are part of the undiscussable domains within communities (Argyris & Schön, 1996) may also be at the heart of problems of relevance to the practitioner community. Because underlying assumptions, values, complexities, and processes are omitted from discussions, research conclusions appear less tentative and conditional than they really are. This sanitization of complexities and uncertainties is likely to make research findings less credible to practitioners who, after all, live and work in "messy" worlds.

In closing, we remind readers that the gap between research and practice has been of longstanding concern to many members of both communities. The number of special forums devoted to the topic of research relevance and utilization has been increasing over time, and the gap between academics and practitioners has been a prominent topic in recent Academy of Management presidential addresses (e.g., Hambrick, 1994; Huff, 2000; Mowday, 1997).

In this introduction to the *Academy of Management Journal*'s Special Research Forum on Knowledge Transfer between Academics and Practitioners,

we have suggested that new models of knowledge creation (e.g., Argyris & Schön, 1996; Choo, 1998; Leonard-Barton, 1995; Nonaka & Takeuchi, 1995) provide powerful tools for understanding the great knowledge creation potential of increased academic-practitioner interaction, as well as for crafting interactive, "double-loop" ways to bring about such interaction. However, Nonaka's model and similar frameworks will be useful for narrowing the research-practice gap only to the extent that knowledge creation is actually a high priority for both academics and practitioners. If the goals of improved knowledge creation and enhanced use of knowledge are dominated by other goals, use of Nonaka's framework is unlikely to prove any more successful than previous efforts to narrow the science-practice gap.

Previous research suggests that rigidity and complacency in the face of changed circumstances are two of the major causes of professional, organizational, and institutional demise (Abbott, 1988; Kotter, 1996; Staw, Sandelands, & Dutton, 1981; Weick, 1996). Concerted effort at all levels, but especially among gatekeepers at the institutional level, will be needed to actualize the potential of academic-practioner relationships to create a truly improved science of organizations.

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Sara L. Rynes is the John F. Murray Professor of Management and the chair of the Department of Management and Organizations at the University of Iowa. She received her Ph.D. from the University of Wisconsin. Her current research interests include knowledge transfer between academics and practitioners, the role of behavioral science in business schools, human resource strategy, organizational compensation, and job search and recruitment.

Jean M. Bartunek is a professor of organization studies at Boston College and currently (2000–01) president-elect of the Academy of Management. She received her Ph.D.

in social and organizational psychology from the University of Illinois at Chicago. Her current research interests focus on intersections of organizational change, cognition, and conflict.

Richard L. Daft holds the Ralph Owen Chair and is associate dean for academic programs in the Owen Graduate School of Management, Vanderbilt University, where he specializes in the study of organizational design, change, and leadership. Professor Daft received his M.B.A. and Ph.D. from the University of Chicago, is a fellow of the Academy of Management, and has served on the editorial boards of the *Academy of Management Journal* and *Administrative Science Quarterly*. He was the associate editor-in-chief of *Organization Science* and served for three years as associate editor of *Administrative Science Quarterly*. Professor Daft has authored or coauthored 11 books, including *Organization Theory and Design* and *Management*. He recently published (with Bob Lengel) *Fusion Leadership: Unlocking the Forces that Change People and Organizations*.