Management Practices and Collective Learning:

An Empirical Study in a Global Pharmaceutical Firm

Heidi K. Gardner
Lisa Moynihan

London Business School
Organizational Behaviour Department
London, UK
hgardner@london.edu
lmoynihan@london.edu

Abstract

What are the management practices that foster collective learning within an organization? A lack of integration between the organizational learning and human resource management literatures means that this important question remains unanswered. Based on a study of 961 employees in 72 worldwide departments of a global pharmaceuticals company, we map the contextual dimensions of discipline, stretch, support and trust onto specific management practices, and use structural equation modelling to show how these practices relate to each of three stages in the collective learning process. We find that discipline and stretch primarily enhance codification behaviors, but without support and trust the groups may not engage in the first two critical stages of experimentation and reflective communications. We thus offer an explanation for *why* all dimensions are essential for collective learning. Finally, we demonstrate that top-down communications is an important predictor of all stages of learning, with both direct and mediated effects.

Keywords: collective learning; human resource management; organizational context.

Suggested track: Managing organizational knowledge and competence

Today's firms face an imperative to build adaptive capabilities for facing common challenges like turbulent markets, global competition and shortening product life cycles. Scholars widely recognize that successful adaptation requires learning – the capacity of firm members to seek ways to improve their performance, evaluate and agree on appropriate options, and implement new courses of action. Individual, agentive action is necessary to fulfill these multiple steps in the learning process (Argyris & Schon, 1978; Friedman, 2003), but interpersonal and collective behaviors are also essential for allowing individual insights and knowledge to influence the adaptive responses of the organization (Fiol & Lyles, 1985; Hedburg, 1981; Kim, 1993; Nonaka & Takeuchi, 1995).

The organizational learning (OL) literature has demonstrated that creating a facilitative environment is essential for promoting members' seeking, choosing and implementing solutions that allow them to adapt and improve. (Davenport, De Long, & Beers, 1998; Gupta & Govindarajan, 2000a; Nonaka & Takeuchi, 1995; O'Dell & Grayson, 1998; Slater & Narver, 1995; von Krogh, 1998). In parallel, the human resource management (HRM) literature recognizes firms' ability to influence member perceptions of their environment by implementing particular management practices. Recently, strategic human resource management scholars have also written conceptual pieces identifying organizational learning and knowledge as competitive firm resources that can be developed through human resource management practices (Barney & Wright, 1998; Snell, Youndt, & Wright, 1996). Yet there is a dearth of research integrating these streams, leading a panel of experts to identify HRM as one of the most important areas for future knowledge research (Lyles & Easterby-Smith, 2003).

This lack of cross-fertilization between the OL and HRM literatures means that an important question remains unresolved: What are the management practices that foster collective learning within an organization? To investigate this question, knowing that the environment is a crucial aspect for learning, we use a contextual model developed by Ghoshal and Bartlett (1994) as a basic organizing framework for our research. This model distils the context into the four constituent elements of discipline, stretch, support and trust. We draw on psychological research to substantiate these four dimensions, and HRM and communications research to map each of them to a discrete set of management practices. Integrating this work with findings from existing research on organizational learning allows us to theorize on how these practices will relate to different stages of the collective learning process.

Based on a study of 961 employees in 72 functional departments of a global pharmaceuticals company ("HealthCo"), we test hypotheses about how these context-shaping practices actually contribute to collective learning. By showing how they influence

different stages of the process, we can provide a heretofore missing explanation for why each of the dimensions is essential for collective learning. This paper answers scholars' repeated calls for more research on factors that encourage different patterns or levels of learning within a firm (e.g., Akgun, Lynn, & Byrne, 2003; Edmondson, 2002).

Theory and Hypotheses

Collective learning

Collective learning is a multi-stage process (Argote, 1999; Edmondson, 1999; Slater & Narver, 1995), requiring both individual action and interpersonal exchange to process knowledge (Friedman, 2003; Kim, 1993; Nonaka & Takeuchi, 1995). A number of scholars have described learning as a cycle of actions that groups undertake to acquire and process knowledge, enabling them to adapt and improve (Argote, 1999; Edmondson, 2002; Fiol & Lyles, 1985). Although the steps may be iterative, it is typical to consider learning as a three-stage process whereby ideas are sought, evaluated and implemented (Gibson & Vermeulen, 2003; Slater & Narver, 1995). Specifically, a group or work unit must first generate ideas for how to improve its work, either by (re)combining existing knowledge to solve problems or by seeking new knowledge to do so. This step can be considered exploration or *experimentation* (Argyris, 1976; Gibson & Vermeulen, 2003; March, 1991). Next, because group members may have developed distinct, non-overlapping mental models (Kim, 1993; Senge, 1990) during the first stage, it is necessary that they engage in a process to reach a common understanding of the new knowledge. Developing a shared mental model requires group members to share ideas and openly communicate through a process of *reflective communication* (Edmondson, 2002; Gibson & Vermeulen, 2003; Kim, 1993). Both these processes are inherently social and require a high degree of interpersonal exchange. Finally, for collective learning to occur, group members must ultimately engage in a process of converting their specific knowledge into a form that is both concrete and generalisable enough that it can be used in the wider organizational setting or in future instances within the same group. Codification includes activities such as documenting how work is done, collecting best practices, and creating a formal system to capture ideas (Davenport & Prusak, 2000). By making their mental models explicit in this way, members allow the group to advance "beyond situational learning" (Kim, 1993: 46) in which the knowledge remains linked only to a particular context and has no bearing on members' adaptive capabilities. Although social interaction is necessary for group members to develop shared values, language and objectives that facilitate this final stage of collective learning (Cohendet & Steinmueller, 2000), the steps of codification such as collecting best practice (Huber, 2001; Menon & Pfeffer, 2003; Moore & Birkinshaw, 1998) and documenting work processes

(Hansen, Nohria, & Tierney, 1999; Nonaka & Takeuchi, 1995) are often depicted more as actions of individual actors.

Because learning focuses on improvement opportunities for a particular task or situation, and because it occurs through a process of interaction among a limited number of interdependent people, collective learning is necessarily a local process (Edmondson, 2002). As such, the learning process is also especially subject to the influence of local conditions. By taking a department-level perspective, it is possible to see how the local context leads to different types and levels of learning by work groups within same organization. We investigated how context-shaping organizational practices affected collective learning behaviors in a sample of 72 departments, defined as collections of individuals that exist within the context of a larger organization, have clearly defined membership and are responsible for a shared service or product (Hackman, 1987). In particular, we build on the Ghoshal and Bartlett (1994) framework by mapping each of their contextual dimensions to a set of specific management practices, and theorizing on how these practices relate to particular stages of the collective learning process.

Contextual dimensions and collective learning

Discipline is the dimension of context that induces employees to deliver on their promised outputs through the judicious use of performance management (Ghoshal & Bartlett, 1994). The goal setting literature substantiates this contextual dimension, with research consistently demonstrating the motivational benefits of assigning specific and difficult goals (for recent reviews see Locke & Latham, 2002; Locke & Latham, 2004). Management practices associated with discipline should therefore include the establishment of specific and challenging goals by setting and tracking appropriate performance metrics. For goals to be effective, people also need feedback to understand their progress in relation to goals (Erez, 1977); regular updates on actual performance against the targets is another discipline-enhancing practice. Finally, research shows that motivational effects are enhanced when individuals feel committed to their goals (Erez & Zidon, 1984) and that one of the factors known to facilitate goal commitment is goal importance (Hollenbeck & Klein, 1987; Klein, Wesson, Hollenbeck, & Alge, 1999; Locke, Saari, Shaw, & Latham, 1981). Practices that increase the importance of attaining a goal include supervisory declarations of support (Locke & Latham, 2002), such as engendering a focus on performance, whereas feedback can increase self-efficacy (Bandura, 1997).

Discipline is likely to influence the codification stage of collective learning because both concepts relate to the setting of baselines and improving of performance against them. Goal setting research shows that setting clear and appropriate performance expectations

(Locke, Saari, Shaw, & Latham, 1981) directs attention to goal-relevant activities. Documenting how the group performs its work, a key part of codification, makes transparent the link between members' actions and their performance; consistent with goal setting theory, we suggest that groups whose members have internalized a sense of discipline are more likely to view codification as a core part of their job and focus attention on it. In addition, this documentation establishes a baseline against which future actions can be measured, as does the capturing of ideas in a formal system. Further, because a sense of discipline induces organizational members to focus on performance improvement, we argue that discipline-related practices would be associated with an increased likelihood of collecting best practice.

Hypothesis 1. Discipline practices are positively related to codification behaviors

Stretch is the contextual dimension that encourages employees to strive for more ambitious objectives, rather than incremental improvements (Ghoshal & Bartlett, 1994). In goal-setting terms, stretch is the factor that explains why individuals set high goals for themselves, whereas discipline explains their motivation to reach established goals. Research shows that goal choice, including the level of difficulty, is predicted by self-efficacy (Locke, Frederick, Lee, & Bobko, 1984; Locke & Latham, 1990) and anticipated instrumentality (Matsui, Okada, & Mizuguchi, 1981; Mento, Locke, & Klein, 1992). Appropriate feedback is a management practice expected to increase efficacy because it provides individuals with increased knowledge about how to adjust their actions to achieve higher performance (Bandura, 1997; Lindsley, Brass, & Thomas, 1995). Management practices can directly influence the perceived instrumentality of attaining goals by linking performance evaluations to important outcomes such as compensation or promotions.

Stretch-inducing practices are likely to be associated with the codification stage of collective learning for several reasons. Stretch practices encourage group members to strive for ambitious performance targets. In turn they would be expected to induce members to collect organizational best practices so that they could benchmark their group against top performers. In a complementary way, stretch practices that heighten self-efficacy would influence members to evaluate their work capabilities favorably, encouraging them to document their own practices as a benchmark for others in the organization. Finally, by increasing the salience of outcome instrumentality, stretch practices are likely to encourage people to document their best work as a way to attract favorable attention to their work.

Hypothesis 2. Stretch practices are positively related to codification behaviors

Trust is the third contextual dimension identified by Ghoshal and Bartlett (1994). Although they do not specifically define trust, their description of it as arising from employees'

beliefs in the fairness and equity of managers' action and in the competence and reliability of others relates closely to cognition-based trust (McAllister, 1995). One specific belief associated with trust is that managers are candid and honest, illustrated in Ghoshal and Bartlett's case study by managers' disclosing the basis for their decisions rather than making back-room, politicized deals. Along with belief in individuals, another aspect of trust is the perceived transparency and honesty of company communications, which enhances members' sense of involvement when they are exposed to a transparent rationale for managerial action. Research has shown involvement to be an important antecedent to trust (Kim & Mauborgne, 1993). Finally, faith in others' competence is a third component of trust, enhanced when members believe they can count on others to keep their word (Butler Jr., 1991; Cook & Wall, 1980; McAllister, 1995).

Unlike the previous two dimensions of discipline and stretch, trust is a not typically embodied in specific management practices; rather as a psychological state (Rousseau & Sitkin, 1998) it is likely to act as a mediator of the impact of management policies on organizational outcomes (Whitener, 2001). Two management practices that are likely to influence the development of trust include effective company communications and supervisory support.

Communications. Building on a definition by Lewis (1987:8), communications practices include any program or action aimed at providing or exchanging messages that are expected to result in a degree of shared meaning between the sender and receiver. Communications practices would be expected to increase cognition-based trust for three reasons. First, communications practices that give information about organizational goals provide people a sense that managers openly share information, thereby enhancing trust. Second, company communications practices that provide more information than is strictly required for the job can produce a situation identified by Nonaka (1990) as information redundancy, whereby organizational members share background knowledge that allows them to communicate freely on aspects of their work that are wider than their specific remit. Information redundancy increases cognition-based trust because it facilitates members' understanding of others' intent and actions, helping to increase perceptions of both reliability and competence. Finally, information about organizational goals further enhances trust by helping to generate a shared vision (Gold, Malhotra, & Segars, 2001; Tsai & Ghoshal, 1998). Thus communications practices providing information on company goals, objectives and performance are likely to foster trust.

Communications research suggests that employee trust is built not only by the content of communications, but also by their perceived effectiveness, including aspects such as accuracy (Dennis, 1974; Roberts & O'Reilly III, 1974) and adequacy (Trombetta & Rogers,

1988). Accurate information is essential to building trust because it enhances the perception of reliability, a key component of cognition-based trust (McAllister, 1990). Adequate information (i.e., match between amount of desired and received information, Trombetta & Rogers, 1988) has been shown to increase employee perceptions that management is trustworthy (Smidts, Pruyn, & Van Riel, 2001), whereas those who receive less information than desired may come to distrust management (O'Reilly, 1989).

Hypothesis 3. Communications practices are positively related to trust

Support. Ghoshal and Bartlett (1994) identify support as a fourth, and final, contextual dimension. They suggest that support includes aspects of autonomy as well as guidance and helping. A set of specific management practices that link to support would therefore include those that enhance participation in decision making, as well as those that give constructive feedback, recognition for good work, and appropriate rewards.

Building on findings in the innovation and learning literatures, we argue that support practices would have their most proximal effects on trust as a cognitive outcome, rather than on collective learning behaviors directly. Trust is cognition-based in that individuals choose whom to trust based on prior evidence of trustworthiness (Lewis & Weigert, 1985; McAllister, 1995); supervisory actions such as giving honest feedback or encouraging open communications would constitute such evidence. In the innovation literature, supervisor support for employees' participation in decision-making has been shown to build perceptions of "participative safety" (West, 1990), which in turn enhances employees' willingness to contribute ideas and contact others for help. Similarly, managerial coaching and support has been shown to create perceptions of "psychological safety" (Edmondson, 1999); these beliefs mediate the relationship between support practices and team members' motivation to offer new ideas and speak their minds.

The HRM literature also suggests that support practices are likely to induce trust. Reward and recognition practices are important elements in developing a cohesive culture where employees can count on one another (Tushman & O'Reilly, 1997) an important aspect of cognitive trust. Also, Whitener (1997) draws on social exchange theory (Blau, 1964) and leader-member exchange theory (Graen & Scandura, 1987) to argue that well-executed performance management practices increase trust-in-supervisor. In summary, supervisory support practices such as participative decision making, reward and recognition, and timely and accurate performance feedback are all expected to contribute to increased employee trust.

Hypothesis 4. Support practices are positively related to trust

We suggest that trust will have a direct impact on collective learning. In particular, trust is likely to influence both the experimentation and reflective communications stages of collective learning. The first stage, as explained above, is the exploration of knowledge through experimentation, which entails idea generation and the sharing and exchange of knowledge. As Nonaka (1994:17, 27) argues, the crucial role of organizations in knowledge creation is establishing "enabling conditions" that heighten individuals' commitment to generating knowledge and sharing it through both informal and formal networks in the organization. Beer and Spector (1993) suggest that management actions can promote an environment that encourages members to give frank appraisals of organizational problems and candid feedback to other members; both are important to the free exchange of knowledge and ideas (Leonard-Barton, 1995). More generally, scholars have cited the importance of trust as a value that promotes knowledge sharing (Gold, Malhotra, & Segars, 2001; Ichijo, Nonaka, & Von Krogh, 1997; Janz & Prasarnphanich, 2003).

Creating a context characterized by trust, where employees believe both in the honesty of superiors and the reliability of peers is also expected to increase opportunities for reflective communications because it allows employees to exchange freely information knowing that they will not be taken advantage of by the other party (Ichijo, Nonaka, & Von Krogh, 1997; von Krogh, 1998). This trust dimension of context echoes findings in the team learning and innovation literatures where "psychological safety" (Edmondson, 1999; Schein, 1993) and "participative safety" (West, 1990) suggest that the environment is perceived as interpersonally non-threatening for open communications and collective reflection.

Hypothesis 5. Trust is positively related to experimentation and reflective behaviors

In addition to the indirect effect of communications practices on learning behaviors through their influence on trust, as argued above, we also propose that communications practices will have a direct association with both experimentation and reflective communications behaviors. First, experimentation involves generating ideas for performance improvement by seeking and sharing knowledge. Effective communications on company performance provide a high degree of transparency and surface potentially difficult issues that might otherwise remain hidden as a result of people's "defensive routines" (Argyris, 1985). For example, in a study of a global technology company Beer & Eisenstadt (1996) found that poor vertical communications were the most frequent barrier to organizational learning because employees felt that difficult issues could not be discussed openly with top management. Overcoming such barriers through communications practices could be a critical step toward encouraging employees to seek improvement opportunities. In a complementary way, communications practices might encourage the sharing of ideas: providing adequate information brings units' levels of information processing capabilities

toward parity, thereby decreasing more knowledgeable parties' desire to withhold information (Barua, Ravindran, & Whinston, 1997). Transparent and widely shared information may also help develop employees' sense of "information self-efficacy" (i.e., belief that one's own information would be helpful to colleagues) thereby enhancing their motivation to share it (Cabrera & Cabrera, 2002).

Second, effective communications practices provide information to facilitates sense-making (Weick, 1979), the core of reflective communications behaviors. When employees have the resources to understand how their roles and objectives fit into the bigger picture, it increases their ability to ask others for relevant information and to offer their ideas to others. By providing organizational members access to the same information on goals and objectives, effective communications help them to develop a shared vision, which is critical for helping organizational members see value in exchanging and combining information (Tsai & Ghoshal, 1998).

Hypothesis 6. Communications practices are positively related to experimentation and reflective behaviors

In a similar vein, we also propose that support practices will have a direct association with both experimentation and reflective communications behaviors, beyond their primary effects on trust. Experimentation involves generating ideas on how to improve performance through the seeking, sharing, and combination of knowledge. Without sufficient support and coaching, an overuse of performance evaluation systems creates "anxiety-generating mechanisms" (Schein, 1993) which decrease learning behaviors. Scherer and Tran (2001) concur, identifying excessive worry and anxiety as some of the "deterrence emotions" that block individual exploration and generally inhibit learning.

Reflective communications create a common understanding of the potential improvement opportunities through open discussion and participation. Organizational theorists such as Walton (1985) have consistently recognized the importance of supervisory support in developing an organization where employees perceive that management welcomes their participation and is promotes open communications. Support also includes providing appropriate reward and recognition, which in turn promotes norms of openness (O'Reilly, 1989). Group-based rewards in particular have been shown to increase openness and sharing (Gupta & Govindarajan, 2000b). Support practices are therefore proposed to have an influence on reflective communications behaviors.

Hypothesis 7. Support practices are positively related to experimentation and reflective behaviors

Methods

Research Site, Procedures and Sample

"HealthCo" is a division of a global pharmaceuticals company headquartered in Europe, with about 5,200 employees in more than 120 geographic sites around the world. HealthCo is an ideal research setting to explore fundamental issues of collective learning for two main reasons. First, the pharmaceuticals industry is highly dependent on knowledge and learning as a part of its innovation process, and HealthCo was no exception: in the previous year's annual report, the Chief Executive of HealthCo's parent company emphasized the importance of knowledge for the firm's ability to sustain its lead in many areas of the business, including R&D, customer service and others. Second, this organization had grown up from a series of mergers; this aspect of its history meant that there was a real difference between organizational units in terms of HRM practices, the local expectations for employees to engage in collective learning, and so on.

Our procedures consisted of (1) preliminary interviews with Human Resource professionals in the firm to understand the nature of knowledge and learning issues within the organization; (2) semi-structured interviews with 42 employees in five countries (Europe and North America) representing all major functions within the company (i.e., General Management, R&D, Manufacturing, Logistics/Customer service, Legal, Regulatory Affairs, Finance, HR, IT, Corporate Strategy)[1] to learn more about the nature of their work and the management practices that encouraged or inhibited learning; (3) survey pilot based on interview findings and a related literature review, conducted with a small group of company employees, and subsequent item modification to improve comprehensibility; (4) a survey of 4314 employees across all departments at all company sites[2], of which 1387 were returned for a response rate of 32%[3].

Sample. Because the current survey was primarily an Internet-based survey, the 4314 employees surveyed comprised (1) all company employees for whom the central HR function had current email addresses and (2) c. 200 employees in the manufacturing function who had no access to the Internet and completed a paper-based version of the survey. The sample included in the present study includes only departments where there were at least three respondents, as it is critical to have multiple respondents when examining shared

[1] Interviews lasted 1-2 hours each and were tape recorded and transcribed.
[2] The survey was translated into 6 additional languages (Chinese, French, German, Italian, Spanish, Norwegian) with back-translation checks. Other sites completed the survey in English.
[3] The 32% response rate was higher than that for internal company surveys, typically 20-25%, likely because the President of HealthCo sent a message to all employees encouraging them to participate. The survey was translated into 6 additional languages (Chinese, French, German, Italian, Spanish, Norwegian) with back-translation checks. Mean differences of the responses were checked, and there were no significant differences on learning outcomes based on either language that the survey was completed in or nationality of the respondent

constructs (Klein & Kozlowski, 2000). In addition, only respondents who are office-based (as opposed to field-based, such as sales representatives or clinical trial administrators) were included, to ensure that they would have ample exposure to the management practices and opportunity for social interaction with their peers presumed to create shared perceptions. These restrictions on the sample meant that of the 1387 returned surveys, 961 (69%) were included in the current study. We checked differences between the respondents included in our final sample compared to those excluded. T-tests indicate no difference between the groups on learning outcomes, with the exception of one item on the reflective communications scale, where excluded respondents reported higher mean levels of idea exchange than those included in our analysis. Respondents represented a wide cross-section of HealthCo.

Research design. To mitigate the problem of same-source bias, we used a multi-source research design (Podsakoff, MacKenzie, Jeong-Yeon, & Podsakoff, 2003). We collected the data for this study by randomly splitting the sample into thirds, and administering a portion of the survey to each set of employees. Data on the discipline, stretch and support practices were on one survey; communications practices were on another. To maximize the number of respondents per variable, however, trust (mediator) items were repeated on two of the three surveys and collective learning (dependent variable) items were all surveys. This way no more than one-third of the respondents overlap between the management practices (independent variables) and collective learning behaviors (dependent variables) examined in tests of the hypotheses; only trust (the mediator) has a significant number of common respondents with the other variables. Table 1 summarizes the survey design and the percent overlap in respondents between each variable.

Table 1: Survey Design And Percent Overlap In Respondents Between Variables

		Survey	Percent overlap in respondents			
			1.	2.	3.	4.
1.	Stretch, Discipline, Support Practices	A				
2.	Communications Practices	C	0%			
3.	Trust	A, B	51%	0%		
4.	Collective Learning	A, B, C	34%	29%	67%	

Measures

Level of analysis. In the present research, it was deemed most appropriate to conduct our study at a departmental level (i.e., the finance department in Oslo, customer service department in Beijing) rather than the organizational, site or team level. First, it is unlikely that shared perceptions such as trust exist at the overarching level of the organization in its entirety, especially for large multi-layered organizations (Anderson & West,

1998). Similarly, the site level was also seen as too heterogeneous, especially in terms of its practices. At the focal organization, a single site could have multiple departments, such as production, corporate strategy and R&D, which vary widely in terms of the types of employees (i.e., exempt/non-exempt) and the management practices associated with each sub-set of employees. Finally, team-level aggregation was not appropriate, as only half of employees reported that they worked primarily (i.e., more than 50% of their time) in teams. Interviews suggested that the departmental level meets the criteria outlined by Anderson and West (1998) for proximal work groups that would be expected to develop shared perceptions of local context and outcomes: personal interaction, common objectives that predispose individuals toward collective action, and sufficient task interdependence to facilitate shared understandings of appropriate behaviors. Our interview findings suggested that these processes are most relevant at the departmental level in this particular organization, and aggregation statistics ($R_{wg(j)}$) also confirmed that the departmental level of analysis was appropriate (see below).

Further, we calculated intraclass correlation coefficients – ICC(1) and ICC(2) – for all variables using one-way analysis of variance (ANOVA) on the individual-level data. It is commonly accepted that an ICC(1) value greater than zero with a corresponding significant F-statistic suggests convergence within groups (Kenny & LaVoie, 1985). All variables met this criterion, with the exception of trust, for which the ICC(1) value exceeded zero but the F-statistic did not reach significance. We also note that the ICC(2) results do not meet the suggested cut-off of .70; Reflective communications had the highest score with only .56. These results suggest that unit means may be unreliable because of somewhat low sample size per survey per department[4] (Bliese & Halverson, 1998). In this case, however, we have followed Klein and Kozlowski's (2000) recommendation for determining the appropriateness of aggregation based on the theoretical rationale discussed above for examining this model's constructs at the department level. We believe that the strong interrater agreement results (e.g., $R_{wg(j)}$ statistics = .79 - .90, see below) provide evidence of the 'sharedness' of the constructs at the department level; aggregation is therefore justified and the mean is the appropriate measure to capture the department's score (Klein & Kozlowski, 2000)

For all measures below, department-level scales were therefore each calculated as the mean of the respective items across respondents. Factor loadings for each item and scales' full aggregation statistics are reported in the Appendix.

[4] Bliese and Halverson (1998) demonstrated that eta squared (variance between means to the total variance) adequately represents the higher-level effect when the number of individuals in each group was large (≥ 25), whereas in small groups (< 8) the discrepancy might be large. The reader is reminded of the group size in the current study: mean = 13, median=8.

Discipline practices. We developed measures for Discipline based on interviews and pre-testing. Four discipline items were rated on 5-point Agreement scales: (1) "There is a real focus on performance here," (2) "My manager regularly updates me on how my department/function is performing against our targets," (3) "Business results are closely tracked and monitored in [this organization]," and (4) "[This organization] has extensive computer-based systems (i.e., SAP) in place to track key performance metrics on an ongoing basis." All items loaded onto a single factor (α = .75). The $R_{wg(j)}$ for this measure was .86.

Stretch practices. Stretch practices were also developed for this study, based on interviews and pre-testing. This scale also included 4 items, rated on 5-point Agreement scales: (1) "The results of the performance evaluation process are used to determine the training needs for employees in this job," (2) "Employees in this job regularly (at least once a year) receive a formal evaluation of their performance," (3) "The results of the performance evaluation process are used to make promotion decisions for employees in this job," and (4) "The performance evaluation process is linked to pay decisions (raises and/or bonuses) for employees in this job." All items loaded onto a single factor (α = .73), with an $R_{wg(j)}$ of .86.

Support practices. There were five items for Support (Greenhaus, Parasuraman, & Wormley, 1990), recorded on 5-point Likert-type scales with 'Very Seldom" and "Almost Always" as anchors: (1) "How often does your manager recognize your efforts to contribute to team goals?" (2) "In the past year, how often has your manager recognized or rewarded your efforts?" (3) "How often does your manager give you performance feedback?" (4) "How often does your manager know if you're doing good work?" and (5) "My supervisor supports my participation in decision making." All items loaded onto a single factor (α = .90). The $R_{wg(j)}$ for this measure was .79.

Communications practices. A number of authors have noted that communications effectiveness depends on a combination of multiple factors such as timeliness, quality, quantity, accuracy, comprehensiveness, consistency, and so on (O'Reilly III & Roberts, 1977; Scott & Mitchell, 1976; Young & Post, 1993; Zack & McKenney, 1995), yet there is no agreement for how to prioritize or weight these characteristics. Rather than assess specific dimensions of communications practices individually, we measured these practices by asking respondents to rate their effectiveness directly, as such measures are common in the communications literature to measure individual perceptions (Jablin & Putnam, 2001). A six-item measure of communications effectiveness was created for this research, using company documents, interviews, and pre-tests to determine appropriate categories. Respondents indicated on a five-point scale of "Not at all effective" to "Completely effective" an answer to the question "In general, how effective are the company communications practices regarding" for the following: (1) Company strategy, (2) Company goals (objectives, actions,

etc.), (3) Industry (external) best practices, (4) Operating performance (productivity, quality, customer satisfaction, etc.), (5) Competitive performance (market share, competitor strategies, benchmarking information, etc.), and (6) Financial performance (profitability, stock price, etc.). All items loaded onto a single factor with high internal reliability (α = .86). The $R_{wg(j)}$ for this measure was .90.

Trust. Respondents completed three items drawn from existing trust scales (Butler Jr., 1991; McAllister, 1995; Robinson, 1996; Smidts, Pruyn, & Van Riel, 2001) and adapted to the current research site. Items were rated on 5-point Agreement scales and include (1) "Managers in my site are candid and honest"[.87], (2) "People at this site generally can count on each other to keep their word" [.83] and (3) "When we receive communications from the company, people generally accept them as true" [.62]. Exploratory factor revealed that all items loaded onto a single variable with acceptable scale reliability (α = .68). The $R_{wg(j)}$ for this measure was .87.

Collective learning behaviors. We earlier described collective learning as a cycle of experimentation, reflection and codification. Although the three stages may be iterative, each represents a specific set of actions that can be separately identified and measured, and we draw on work by Gibson and Vermeulen (2003) to do so. Items were rated on 5-point Agreement scales. In particular, *experimentation* was measured with three items adapted from Gibson & Vermeulen (2003), asking respondents to rate the extent to which people in their site: (1) "do a good job of sharing their individual ideas to come up with new ideas, products or services" [.91], (2) "are proficient at combining and exchanging ideas to solve problems" [.88] and (3) "are capable of sharing their expertise to bring new projects or initiatives to fruition" [.87]. All items loaded onto a single factor with high reliability (α = .86; $R_{wg(j)}$ = .86). *Reflective communication* was measured with three items drawn directly from Gibson & Vermeulen (2003): (1) "There is open communication in this site" [.87], (2) "At this site, everyone has a chance to have their say" [.86], and (3) "There is a high level of idea exchange among employees in this site" [.74]. All items loaded onto a single factor (α = .75; $R_{wg(j)}$ = .80). Finally, we used three items from Gibson & Vermeulen (2003) to measure Codification: (1) "This organization attempts to centrally collect best practices" [.86], (2) "Departments in this site carefully document how they do their work" [.79] and (3) "This organization has a formal system to capture good ideas made by teams or departments" [.79]. All three items loaded onto a single factor (α = .74; $R_{wg(j)}$ = .79).

Results

Table 2 contains the means, standard deviations, and correlations of the study variables. Path analysis was used to test our hypotheses.

Table 2: Means, Standard Deviations, And Correlation Coefficients

	Variable	Mean	S.D.	Min	Max	1.	2.	3.	4.	5.	6.	7.
1.	Discipline	3.59	0.53	2.0	5.0							
2.	Stretch	3.71	0.44	2.6	5.0	.33**						
3.	Support	3.18	0.39	2.0	4.2	.13	.10					
4.	Comms	3.24	0.53	1.3	4.7	.08	.20	-.05				
5.	Trust	3.74	0.26	3.1	4.3	.11	.09	.37 **	.21			
6.	Experiment	3.37	0.32	2.3	4.5	.06	.15	.13	.30 *	.34 **		
7.	Reflect	3.36	0.42	2.3	4.3	-.01	.27 *	.31 **	.45 **	.59 **	.53 **	
8.	Codify	3.12	0.41	2.0	4.5	.43 **	.42 **	.01	.32 *	.06	.12	.16
7.	Group size	13	15.1	3	80							

N = 72 * p<.05 , ** p< .01,

In hypothesis 1, we stated that the discipline practices should be positively related to codification behavior. Our findings show that hypothesis 1 is supported. Discipline practices are significantly positively related to codification (0.34, $p < .001$)

In hypothesis 2, we stated that stretch practices should also be positively related to codification behavior. Our findings show that hypothesis 2 is supported. Discipline practices are significantly positively related to codification (0.32, $p < .001$).

In hypotheses 3 and 4, we predicted that communications and support practices would be positively related to trust. These hypotheses are also supported as communications practices are significantly related to trust (0.39, $p < .001$) and support is positively related to trust (0.23, $p < .05$).

Hypothesis 5a, that trust would be positively related to experimentation, was supported (0.44, $p < .001$). We also find support for hypothesis 5b, as trust was significantly related to reflective behaviors (0.25, $p < .05$).

Communications practices are also positively related to reflection (0.42, $p < .001$) and experimentation (0.32, $p < .01$), supporting hypotheses 6a and 6b. However, support practices had no effect on reflection or experimentation, failing to support hypotheses 7a and 7b.

In general, the goodness of fit indices show that the hypothesized model fits the data relatively well (χ^2 = . 33.5, *df*=18; IFI=.86; CFI=.83; NFI=.74, RMSEA=.11) (Bentler and Bonett 1980). The results suggest that human resource practices have a significant positive effect on learning behaviors, both directly, and indirectly through their effect on trust.

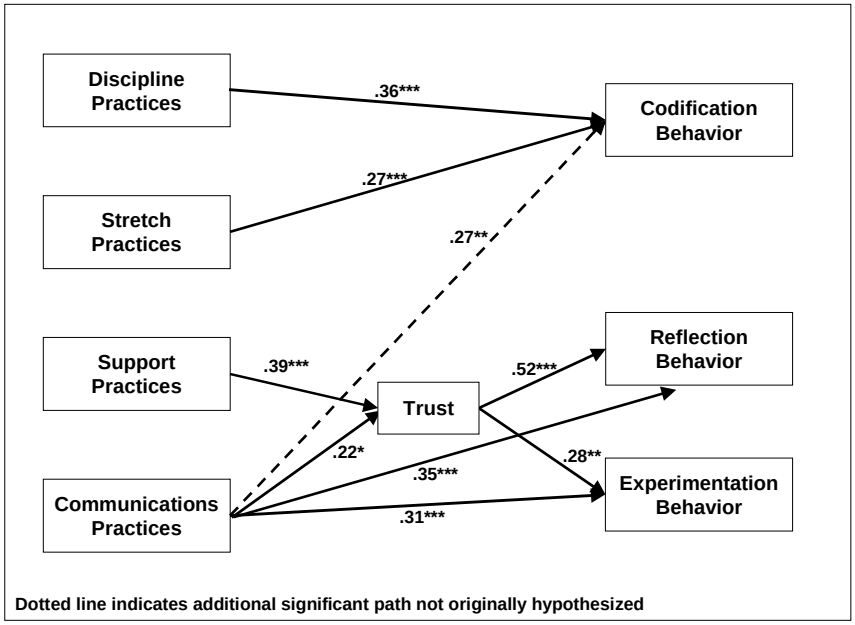
We examined alternative path models by using chi-square difference tests and several goodness-of-fit indices, including CFI, NFI, and RMSEA (Hu and Bentler 1995), as shown in

Table 3. Model 2 is a complete partial mediation model that includes paths between all four sets of HR practices and all three learning behaviors partially mediated by trust. Model 3 is a direct effect model (removing paths between HR practices of communications and support and trust and trust and experimentation and reflection). Model 4 is an alternative model with all four practices predicting all three learning outcomes partially mediated by trust. Compared to Model 1 (the hypothesized model model), models 2 and 3 have a significantly worse fit (see Table 3). Model 4, however, does not significantly differ from our hypothesized model, indicating that the overall fit of these models is comparable. Based on this, we also examined a fifth model, which included the significant paths from our hypothesized model as well as additional paths suggested in model 4. Figure 1 shows the final trimmed model, which is our accepted final model (supported by the lower AIC and BCC statistics than model 1). This model shows an additional significant path we did not originally hypothesize, which is that of communications practices positively affecting codification behavior (0.27, $p < .01$).

Table 3: Alternative Path Model Comparison

Model	**CFI**	**IFI**	**NFI**	**RMS EA**	**AIC**	**BCC**	**χ^2, df**	**Difference from Model 1**
Model 1: Hypothesized partial mediation model	.83	.86	.74	.11	85.5	93.1	33.5, 18	
Model 2: Alternative model: trust fully mediates communications and support practices	.65	.70	.59	.14			54.5, 22	**21, 4***** (significantly worse fit)
Model 3: Alternative model: removing trust as a mediator of communications and support practices	.46	.53	.44	.18			72.7, 22	**39.2, 4***** (significantly worse fit)
Model 4: Alternative model with all four practices predicting all three learning outcomes partially mediated by trust	.86	.89	.83	.14			22.1, 9	**11.4, 9**
Model 5: Final model (Figure 3)	.89	.90	.78	.09	80.7	88.3	28.7, 18	**--**

Figure 1: Alternative Path Model Comparison



Discussion And Implications

In this study, we set out to investigate which management practices foster collective learning within an organization. Building on a contextual model developed by Ghoshal and Bartlett (1994) provided us with a framework to identify and test specific practices that we theorized would be linked to particular stages of the collective learning process. We found strong evidence that these context-shaping practices are differentially associated with particular collective learning behaviors, and this study raises important issues for both theory and practice.

Before discussing these implications, though, it is important to note that while analytical results support six of our seven hypotheses, they also allow us to improve our initial theoretical model in two ways. Somewhat surprisingly, supervisory support was not shown to be associated with either experimentation or reflection behaviors. Although support is linked with trust, and trust with these behaviors, perhaps the link between support and collective learning is too distal (and possibly mediated by additional factors) to produce identifiable results. Our finding is similar to prior research in the team learning literature, where Edmondson (1999) found that supervisor coaching was linked to psychological safety but was not a significant predictor of team learning. Additionally, our analysis demonstrated that communications practices are significantly associated with codification behaviors, a relationship that we did not originally hypothesize. We can interpret this finding in light of research by Davenport et al (1998), suggesting that improved access to company

information was a key to successful knowledge management projects, which rely heavily on codification behaviors. These two modifications to our original model are therefore not inconsistent with prior knowledge research, and our results allow us to make several contributions to existing research.

By integrating findings from human resource management research, this study fills an important gap in the organizational learning literature: identifying and testing what specific management practices are associated with collective learning. Using a large sample and rigorous empirical methods, we are able to show that three specific sets of management practices have direct influence on collective learning. Further, we show that cognition-based trust is a mediator of the relationship between support practices and collective learning. Because Ghoshal and Bartlett's (1984) original model was based solely on a qualitative case study, this mediating relationship was not apparent. Research that built on the Ghoshal and Bartlett framework (e.g., Gibson & Birkinshaw, 2004) has grouped the contextual variables of support and trust, also masking the more complex relationship. One practical implication from our updated model is that managers who implement "hollow" support practices (e.g., insincere feedback) in an attempt to increase collective learning may instead find their efforts backfiring, as such practices could erode trust.

Further, we show how these context-shaping practices influence different stages of the collective learning process. Discipline and stretch primarily enhance codification behaviors, but without support and trust the groups may not engage in the first two critical stages of experimentation and reflective communications. Additionally, we demonstrate that effective top-down communications – a factor often neglected in both OL and HRM research – is an important predictor of all stages of learning, with both direct and mediated effects. A further theoretical contribution of our research is thus an explanation for why each of the dimensions is essential for collective learning.

Lastly, this research benefits both from a design that multi-cultural and field-based, both of which have been called for in the literature. Tsang (1997) notes that so far research in the knowledge area suffers from a major deficiency in that data has been mostly collected in Western organizations. This research used data from units in 11 countries across the world, comprising individuals of at least 39 nationalities. Its cross-cultural generalisability should therefore be high. Finally, because this research is field-based, it provides an increased understanding of actual knowledge processes and conditions that scholars have called for (e.g., "Alavi & Leidner, 2001; Leonard-Barton & Sensiper, 1998).

Managerial implications. Many managers agree that the information economy has lead to the increased importance of information and knowledge sharing among employees.

As competition among technology-based firms has increased, the source of competitive advantage in these firms is moving away from tangible resources, which can be easily imitated, to knowledge creation capabilities housed in the workforce (Argote & Ingram, 2000; Nonaka & Takeuchi, 1995; Teece, 1998). This paper contributes to our understanding of which management practices can be used to encourage learning in organizations. In particular, managers can work to build employee trust by providing adequate supervisory support in the form of encouraging participation in decision making, and providing constructive feedback along with recognition and appropriate rewards for good work; trust in turn enhances employees' experimentation and reflection behaviors. Instituting effective communications practices to provide information on company goals, objectives and performance are also likely to foster trust, and to boost all stages of collective learning directly. Finally, to enhance codification behaviors that are essential to capture learning and make it usable for wider parts of the organization, managers can use performance-enhancing practices such as establishing and tracking key performance metrics, providing regular updates on actual performance against the targets (discipline) and providing formal individual performance appraisals and linking them to important outcomes such as compensation (stretch).

Limitations. The choices made in conducting this research led to some clear study limitations. First, while some precautions were taken to avoid common response bias, there were some (up to 50%) overlapping respondents between any two items in the model. The choice to repeat some survey items on two or three sections of the split sample was made to increase reliability of the model by maintaining a greater number of respondents per measure (Bliese & Halverson, 1998). Second, it is recognized that self-report measures can create common method variance. However, a number of our key variables have low susceptibility to this problem: Crampton and Wagner (1994) found organizational culture to be relatively free of percept-percept inflation, while some HR practices (performance feedback, supervisor support) fall into the group where "the effects of self-report methods on research in these areas cannot be considered self-evident" (Crampton & Wagner III., 1994:73). In addition, response bias is more likely to occur when scales with overtly similar content are used, scales are more contiguous on the survey, few items are used to measure constructs, and constructs are novel (Harrison, Mclaughlin, & Coalter, 1996). We believe these issues should not arise in our research: the scales' content are considerably different, scales were non-contiguous on the surveys, each variable comprised at least three items, and pre-testing confirmed that respondents were familiar with the constructs. Finally, this study relies on cross-sectional data that cannot show causation; without longitudinal data, we can only investigate an association between management practices, trust and collective learning

behaviors. We believe, however, that there is enough theoretical rationale to suggest that the findings are appropriately represented in the model.

In conclusion, because this research demonstrates that certain context-shaping management practices are positively associated with different stages of the collective learning process, it suggests that each of the practices are important for promoting learning. Future research using longitudinal data could confirm the causal nature of these relationships. Further, because we used a departmental-level perspective to examine collective learning within this global company, we are able to shed some light on how local (i.e., departmental) variations in management practices influence local learning. Despite its limitations, we believe that this study makes an important step toward integrating human resource management with organizational learning research.

References

Akgun, A.E., Lynn, G.S., & Byrne, J.C. (2003) Organizational learning: A socio-cognitive framework. ***Human Relations,*** 56(7): 839-868.

Alavi, M. & Leidner, D.E. (2001) Review: knowledge management and knowledge management systems: conceptual foundations and research issues. ***MIS Quarterly,*** 25(1): 107-133.

Anderson, N.R. & West, M.A. (1998) Meauring climate for work group innovation: Development and validation of the team climate inventory. ***Journal of Organizational Behavior,*** 19(3): 235-258.

Argote, L. (1999) ***Organizational learning: creating, retaining and transferring knowledge*** . Boston, Mass: Kluwer.

Argote, L. & Ingram, P. (2000) Knowledge transfer: A basis for competitive advantage in firms. ***Organizational Behavior & Human Decision Processes,*** 82(1): 150-168.

Argyris, C. (1976) Single-loop and double-loop models in research on decision making. ***Administrative Science Quarterly,*** 21(3): 363-376.

Argyris, C. (1985) ***Strategy, Change and Defensive Routines***. Boston: Pittman.

Argyris, C. and D. Schon. (1978) ***Organizational Learning: An Action Perspective***. Reading, Mass: Addison-Wesley.

Bandura, A. (1997) ***Self-efficacy: The Exercise of Control***. New Yotk: Freeman.

Barney, J.B. & Wright, P.M. (1998) On becoming a strategic partner: The role of human resources in gaining competitive advantage. ***Human Resource Management,*** 37(1): 31-46.

Barua, A., Ravindran, S., & Whinston, A.B. (1997) Effective intra-organizational information exchange. ***Journal of Information Science,*** 23(3): 239-248.

Beer, M. & Eisenstat, R.A. (1996) Developing an organization capable of implementing strategy and learning. ***Human Relations,*** 49(5): 597-621.

Beer, M. & Spector, B. (1993) Organizational diagnosis: Its role in organizational learning. ***Journal of Counseling & Development,*** 71(6): 642-657.

Blau, P.M. (1964) ***Exchange and power in social life*** . New York: Wiley and Sons.

Bliese, P.D. & Halverson, R.R. (1998) Group size and measures of group-level properties: An examination of eta-squared and ICC values. ***Journal of Management,*** 24(2): 157-172.

Butler Jr., J.K. (1991) Toward understanding and measuring conditions of trust: Evolution of a conditions of trust inventory. ***Journal of Management,*** 17(3): 643-663.

Cabrera, A. & Cabrera, E. (2002) Knowledge-sharing dilemmas. ***Organization Studies,*** 23(5): 687-710.

Cohendet, P. & Steinmueller, W. (2000) The codification of knowledge: a conceptual and empirical exploration. ***Industrial & Corporate Change,*** 9(2): 195-209.

Cook, J. & Wall, T. (1980) New work attitude measures of trust, organizational commitment and personal need non-fulfillment. ***Journal of Occupational Psychology,*** 53: 39-52.

Crampton, S.M. & Wagner III., J.A. (1994) Percept-Percept Inflation in Microorganizational Research: An Investigation of Prevalence and Effect. ***Journal of Applied Psychology,*** 79(1): 67-76.

Davenport, T.H., De Long, D.W., & Beers, M.C. (1998) Successful knowledge management projects. ***Sloan Management Review,*** 39(2): 43-57.

Davenport, T.H. and L. Prusak. (2000) ***Working Knowledge: How Organizations Manage What They Know***. Cambridge, Massachusetts: Harvard Business School Press.

Dennis, H.S. 1974. ***A Theoretical and Empirical Study of Managerical Communication Climate in Complex Organizations***. Purdue University, West Lafayette, IN, unpublished doctoral dissertation

Edmondson, A. (1999) Psychological safety and learning behavior in work teams. ***Administrative Science Quarterly,*** 44(2): 350-383.

Edmondson, A.C. (2002) The local and variegated nature of learning in organizations: A group-level perspective. ***Organization Science,*** 13(2): 128-146.

Erez, M. (1977) Feedback: A necessary condition for the goal setting-performance relationship. ***Journal of Applied Psychology,*** 62(5): 624-627.

Erez, M. & Zidon, I. (1984) Effect of goal acceptance on the relationship of goal difficulty to performance. ***Journal of Applied Psychology,*** 69(1): 69-78.

Fiol, C.M. & Lyles, M.A. (1985) Organizational learning. ***Academy of Management Review,*** 10(4): 803-813.

Friedman, V.J. (2003) The individual as agent of organizational learning In M. Dierkes, Antal Ariane B., J. Child &

I. Nonaka, (Eds.), ***Handbook of Organizational Learning and Knowledge***. Oxford : Oxford University Press.

Ghoshal, S. & Bartlett, C.A. (1994) Linking organizational context and managerial action: the dimensions of quality of management. ***Strategic Management Journal,*** 15(5): 91-112.

Gibson, C. & Vermeulen, F. (2003) A healthy divide: Subgroups as a stimulus for team learning behavior. ***Administrative Science Quarterly,*** 48(2): 202-239.

Gibson, C.B. & Birkinshaw, J. (2004) The antecedents, consequences, and mediating role of organizational ambidexterity. ***Academy of Management Journal,*** 47(2): 209.

Gold, A.H., Malhotra, A., & Segars, A.H. (2001) Knowledge management: An organizational capabilities perspective. ***Journal of Management Information Systems,*** 18(1): 185-214.

Graen, G.B. & Scandura, T.A. (1987) Toward a psychology of dyadic organizing. ***Research in Organizational Behavior,*** 9: 175-208.

Greenhaus, J.H., Parasuraman, S., & Wormley, W.M. (1990) Effects of race on organizational experience, job performance evaluations, and career outcomes. ***Academy of Management Journal,*** 33(1): 63-86.

Gupta, A.K. & Govindarajan, V. (2000a) Knowledge flows within multinational corporations. ***Strategic Management Journal,*** 21(4): 473-496.

Gupta, A.K. & Govindarajan, V. (2000b) Knowledge management's social dimension: Lessons from Nucor Steel. ***Sloan Management Review,*** 42(1): 71-80.

Hackman, J.R. (1987) The design of work teams In J. Lorsch, (Ed.), ***Handbook of Organizational Behavior***. Englewood Cliffs, NJ: Prentice-Hall.

Hansen, M.T., Nohria, N., & Tierney, T. (1999) What's Your Strategy for Managing Knowledge? ***Harvard Business Review,*** 77(2): 106-116.

Harrison, D.A., Mclaughlin, M.E., & Coalter, T.M. (1996) Context, cognition and common method variance: Psychometric and verbal protocol evidence. ***Organizational Behavior & Human Decision Processes,*** 68(3): 246-260.

Hedburg, B. (1981) How organizations learn and unlearn In Nystrom & Starbuck, (Eds.), ***Handbook of Organizational Design***. 3-27. Oxford University Press.

Hollenbeck, J.R. & Klein, H.J. (1987) Goal commitment and the goal-setting process: Problems, prospects, and proposals for future. ***Journal of Applied Psychology,*** 72(2): 212-220.

Huber, G.P. (2001) Transfer of knowledge in knowledge management systems: Unexplored issues and suggested studies. ***European Journal of Information Systems,*** 10(2): 72-79.

Ichijo, K., Nonaka, I., & Von Krogh, G. (1997) Develop knowledge activists! ***European Management Journal,*** 15(5): 475-483.

Jablin, F.M. and L.L. Putnam. (2001) ***The New Handbook of Organisational Communication: Advances in Theory, Research and Methods***. Thousand Oaks: Sage.

Janz, B.D. & Prasarnphanich, P. (2003) Understanding the antecedents of effective knowledge management: the importance of a knowledge-centered culture. ***Decision Sciences,*** 34(2): 351-384.

Kenny, D.A. & LaVoie, L. (1985) Separating individual and group effects. ***Journal of Personality and Social Psychology ,*** 48: 339-348.

Kim, D.H. (1993) The link between individual and organizational learning. ***Sloan Management Review,*** 35(1): 37-50.

Kim, W.C. & Mauborgne, R.A. (1993) Procedural justice, attitudes, and subsidiary top management compliance with multinationals' corporate strategic decisions. ***Academy of Management Journal,*** 36(3): 502-526.

Klein, H.J., Wesson, M.J., Hollenbeck, J.R., & Alge, B.J. (1999) Goal commitment and the goal-setting process: conceptual clarification and empirical synthesis. ***Journal of Applied Psychology,*** 84(6): 885-896.

Klein, K.J. & Kozlowski, S.W.J. (2000) A multilevel approach to theory and research in organizations In K.J. Klein & S.W.J. Kozlowski, (Eds.), ***Multilevel Theory, Research and Methods in Organizations***. 3-90. San Francisco: Jossey-Bass.

Leonard-Barton, D. (1995) ***Wellsprings of Knowledge: Building and Sustaining the Sources of Innovation***. Boston: Harvard Business School Press Books.

Leonard-Barton, D. & Sensiper, S. (1998) The role of tacit knowledge in group innovation. ***California Management Review,*** 40(3): 112.

Lewis, J.D. & Weigert, A. (1985) Trust as a social reality. ***Social Forces,*** 63(4): 967-985.

Lewis, P. (1987) ***Organizational Communication: The Essence of Effective Management***. New York: Wiley.

Lindsley, D.H., Brass, D.J., & Thomas, J.B. (1995) Eficacy-performing spirals: a multilevel perspective. ***Academy of Management Review,*** 20(3): 645-678.

Locke, E.A., Saari, L.M., Shaw, K.N., & Latham, G.P. (1981) Goal setting and task-performance - 1969-1980. ***Psychological Bulletin,*** 90(1): 125-152.

Locke, E.A., Frederick, E., Lee, C., & Bobko, P. (1984) Effect of self-efficacy, goals, and task strategies on task performance. ***Journal of Applied Psychology,*** 69(2): 241-251.

Locke, E.A. and G.P. Latham. (1990) ***A Theory of Goal Setting and Task Performance***. Englewood Cliffs, NJ: Prentice Hall.

Locke, E.A. & Latham, G.P. (2002) Building a practically useful theory of goal setting and task motivation. ***American Psychologist,*** 57(9): 705-717.

Locke, E.A. & Latham, G.P. (2004) What should we do about motivation theory? Six recommendations for the twenty-first century. ***Academy of Management Review,*** 29(3): 388-403.

Lyles, M.A. & Easterby-Smith, M. (2003) Organizational learning and knowledge management: Agendas for future research In M.A. Lyles & M. Easterby-Smith, (Eds.), ***Blackwell Handbook of Organizational Learning & Knowledge Management***. 639-652. Oxford: Blackwell.

March, J.G. (1991) Exploration and exploitation in organizational learning. ***Organization Science,*** 2(1): 71.

Matsui, T., Okada, A., & Mizuguchi, R. (1981) Expectancy theory prediction of the goal theory postulate. 'The harder the goals, the higher the performance'. ***Journal of Applied Psychology,*** 66(1): 54-58.

McAllister, D.J. (1995) Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. ***Academy of Management Journal,*** 38(1): 24-59.

Menon, T. & Pfeffer, J. (2003) Valuing internal vs. external knowledge: Explaining the preference for outsiders. ***Management Science,*** 49(4): 497-513.

Mento, A.J., Locke, E.A., & Klein, H.J. (1992) Relationship of goal level to valence and instrumentality. ***Journal of Applied Psychology,*** 77(4): 395-405.

Moore, K. & Birkinshaw, J. (1998) Managing knowledge in global service firms: Centers of excellence. ***Academy of Management Executive,*** 12(4): 81-92.

Nonaka, I. (1990) Redundant, overlapping organization: A Japanese approach to managing the innovation process. ***California Management Review,*** 32(3): 27-38.

Nonaka, I. and H. Takeuchi. (1995) ***The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation***. Oxford : Oxford University Press.

O'Dell, C. & Grayson, C.J. (1998) If only we knew what we know: Identification and transfer of internal best practices. ***California Management Review,*** 40(3): 154-174.

O'Reilly, C. (1989) Corporations, Culture, and Commitment: Motivation and Social Control in Organizations. ***California Management Review,*** 31(4): 9-25.

O'Reilly III, C.A. & Roberts, K.H. (1977) Task group structure, communication, and effectiveness in three organizations. ***Journal of Applied Psychology,*** 62(6): 674-681.

Podsakoff, P.M., MacKenzie, S.B., Jeong-Yeon, L., & Podsakoff, N.P. (2003) Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. ***Journal of Applied Psychology,*** 88(5): 879.

Roberts, K.H. & O'Reilly III, C.A. (1974) Failures in upward communication in organizations: three possible culprits. ***Academy of Management Journal,*** 17(2): 205-215.

Robinson, S.L. (1996) Trust and breach of the psychological contract. ***Administrative Science Quarterly,*** 41(4): 26p-574.

Rousseau, D.M. & Sitkin, S.B. (1998) Not so different after all: A cross-discipline view of trust. ***Academy of Management Review,*** 23(3): 393-405.

Schein, E.H. (1993) How can organizations learn faster? The challenge of entering the green room. ***Sloan Management Review,*** 34(2): 85-94.

Scherer, K.R. & Tran, V. (2001) Effects of emotion on the process of organizational learning In M. Dierkes, A.B. Antal, J. Child & I. Nonaka, (Eds.), ***Handbook of Organizational Learning and Knowledge***. 369-392. Oxford: Oxford University Press.

Scott, W.G. and T.R. Mitchell. (1976) ***Organization Theory: A Structural and Behavioral Analysis***. 3rd edn. Homewood, Illinois: Irwin, Inc.

Senge, P. (1990) ***The Fifth Discipline***. New York: Doubleday.

Slater, S.F. & Narver, J.C. (1995) Market orientation and the learning organization. ***Journal of Marketing,*** 59(3): 63-74.

Smidts, A., Pruyn, A.Th.H., & Van Riel, C.B.M. (2001) The impact of employee communication and perceived external prestige on organizational identification. ***Academy of Management Journal,*** 44(5): 1051-1062.

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

Teece, D.J. (1998) Capturing value from knowledge assets: The new economy, markets for know-how, and intangible assets. ***California Management Review,*** 40(3): 55-79.

Trombetta, J.J. & Rogers, D.P. (1988) Communication climate, job satisfaction, and organizational commitment: the effects of information adequacy, communication openness, and decision participation. ***Management Communication Quarterly,*** 1(4): 494-514.

Tsai, W. & Ghoshal, S. (1998) Social capital and value creation: The role of intrafirm networks. ***Academy of Management Journal,*** 41(4): 464-476.

Tsang, E.W.K. (1997) Organizational learning and the learning organization: A fichotomy between descriptive and prescriptive research. ***Human Relations,*** 50(1): 73-89.

Tushman, M.L. and I.C.A. O'Reilly. (1997) ***Winning Through Innovation: A Practical Guide to Leading Organizational Change and Renewal*** . Boston, Massachusetts: Harvard Business School Press.

von Krogh, G. (1998) Care in knowledge creation. ***California Management Review,*** 40(3): 133-153.

Weick, K.E. (1979) Cognitive processes in organizations. ***Research in Organizational Behavior,*** 1: 41-74.

West, M.A. (1990) The social psychology of innovation in groups In M.A. West & J.L. Darr, (Eds.), ***Innovation and Creativity at Work***. 309-333. New York: Wiley.

Whitener, E.M. (2001) Do "high commitment" human resource practices affect employee commitment? A cross-level analysis using hierarchical linear modeling. ***Journal of Management,*** 27(5): 515-535.

Whitener, E.M. (1997) The impact of human resource activities on employee trust. ***Human Resource Management Review,*** 7(4): 389-405.

Young, M. & Post, J.E. (1993) Managing to communicate, communicating to manage: How leading companies communicate with employees. ***Organizational Dynamics,*** 22(1): 31-61.

Zack, M.H. & McKenney, J.L. (1995) Social context and Interaction in ongoing computer-supported management groups. ***Organization Science,*** 6(4): 394-422.