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Understanding Employees' Willingness to Contribute to Shared Electronic Databases

A Three-Dimensional Framework

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Work organizations increasingly adopt shared electronic databases. However, employees' unwillingness to contribute to shared resources undermines the utility of such technologies. Current research is limited to either a utilitarian or normative perspective. To advance understanding in this area, this study proposes a three-dimensional framework. It includes the utilitarian and normative perspectives as two complementary dimensions in addition to a third collaborative dimension. Based on this framework, the study identifies three key organizational processes and advances an additive model to predict employees' willingness to contribute to shared electronic databases. An empirical test was conducted to assess the model in a large manufacturing organization. The test showed both significant overall effects of the model and significant main effects of each predictor variable. The article will discuss the findings and address both theoretical and practical implications.

Keywords: *information sharing; collective action; organizational knowledge; knowledge management; collaboration; communities of practice; identification*

Organizations increasingly adopt electronic databases for the purpose of pooling information as shared resources (Kankanhalli, Tan, & Wei, 2005). Research shows that information sharing contributes to organizational efficiency, learning, and innovation (Constant, Kiesler, & Sproull, 1994). In reality, however, the desired success is far from guaranteed (Constant et al., 1994). Employees' reluctance or resistance to contribute to shared electronic databases results in information undersupply and underutilization of such technologies (Connolly & Thorn, 1990). Although organizations have the option to force participation by administrative means, employees' unwillingness can lead to substandard information and undermine the managerial purpose (Kalman, Monge, Fulk, & Heino, 2002). To understand employees' willingness to contribute to shared electronic databases, we intend to advance a three-dimensional framework based on current theoretical development.

Two single-dimensional perspectives dominate extant research in this area. One is a utilitarian perspective, assuming individuals to be calculative, driven by self-interests.

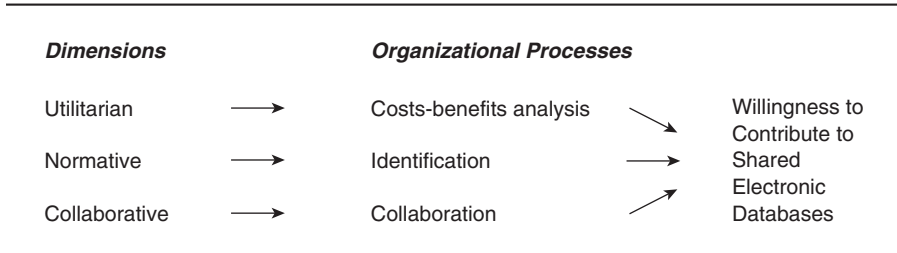
It has spawned calculative models in predicting information contribution and sharing behavior (e.g., Connolly & Thorn, 1990; Connolly, Thorn, & Heminger, 1992). These models find their theoretical roots in theories of collective action (Hardin, 1971, 1982; Marwell & Oliver, 1993; Olson, 1965) and social dilemma (Dawes, 1980; Messick & Brewer, 1983; van Lange, Liebrand, Messick, & Wilke, 1992). The other is a normative perspective, assuming individuals to be prosocial and value based, driven by such factors as organizational norms and commitment (O'Reilly & Chatman, 1986). It generates normative theoretical models (e.g., Kalman et al., 2002), which find their roots mostly in motivation theories (Staw, 1984). In the present study, we argue that the two single-dimensional perspectives are complementary instead of opposing each other. Neither of them alone offers exhaustive explanations of the phenomenon. In addition, we propose a third dimension—a collaborative perspective in light of the increasing team-based organizational arrangements (LaFasto & Larson, 2001) and growing understanding of communities of practice (e.g., Brown & Duguid, 1991; Heaton & Taylor, 2002; Wenger, 1998). Combining the two single theoretical perspectives together with a third collaborative dimension, we will offer a three-dimensional multitheoretical framework.

This framework suggests that we understand employee information contribution as the outcome of three key organizational processes (see Figure 1): (a) the process of costs-benefits analysis in which employees assess their personal welfare in the organization, (b) the process of organizational identification (OI) in which employees form their relationship with the organization, and (c) the process of collaboration in which employees work together and develop positive or negative orientations toward collaboration. Based on the three organizational processes, we will construct an additive model to predict employees' willingness to contribute to shared electronic databases. The model is not intended to exhaust all the possible dimensions and processes. Rather, we propose it as a heuristic framework on which future research can be built.

Researchers in related fields have shown the benefits of multitheoretical efforts. For instance, Contractor and Monge (2002) and Monge and Contractor (2003) demonstrate in network analysis that a multitheoretical perspective can integrate existing single-theory models and significantly improve explanatory power. In practice, organizations have experienced limitations of single-theory guided efforts, such as monetary incentives and cultural activities. Such efforts are often uncoordinated and contradictory with each other when implemented. We believe that a multitheoretical framework will help managers establish policies and practices from various angles that work in an integrative and coherent manner.

We begin the article by reviewing and examining the utilitarian and normative perspectives and their related organizational processes respectively. Following the review, we will introduce our proposed collaborative perspective and advance a three-dimensional framework, based on which an additive model, predicting employees' willingness to contribute to shared electronic databases, is hypothesized. We will report an empirical test of the model we conducted among a sales force of a large manufacturing organization in the United States and discuss the findings and implications.

Figure 1
A Three-Dimensional Framework on Employees’
Willingness to Contribute to Shared Electronic Databases



A Utilitarian Perspective and Costs-Benefits Analysis

A utilitarian perspective underlies research that examines employee participation in shared resources by extending theories of collective action (Hardin, 1971, 1982; Marwell & Oliver, 1993; Olson, 1965) and social dilemma (Dawes, 1980; Messick & Brewer, 1983; van Lange et al., 1992). Although having different theoretical origins, both theories of collective action and social dilemma attempt to understand and predict the conditions under which collective endeavors can be achieved to serve the interests of its members. In both theories, individuals are assumed to be rational and self-interested and to often act for the purpose of maximizing individual profits and minimizing costs.

This perspective strongly emphasizes that individual and collective interests are inherently at odds and fundamentally incompatible. Within this perspective, whether to contribute to a collective good is a matter of calculation and compromise between costs and benefits in relation to an individual’s personal welfare (Marwell & Oliver, 1993). When a collective good is shared, rational individuals prefer to free ride to minimize their personal costs, although contribution to the collective good is in the interest of the collective (Hardin, 1982; Marwell & Oliver, 1993). For instance, knowing that I will be able to enjoy the benefits negotiated by the union anyway, I might not pay my dues to become a member (van Lange et al., 1992).

Communication research within this perspective frames the research problem as a communication dilemma, a situation of a collective in which “hoarding one’s knowledge may be more rational than communicating it, but when all follow this individually rational strategy the group may not achieve its goal and all are worse off” (Bonacich & Schneider, 1992, p. 227). Drawing on theories of collective action and social dilemma, an influential study by Connolly and Thorn (1990) argues that organizational information is discretionary because an individual member who owns the information can choose to, or not to, share it with others and that whether to communicate that information or not is subject to an individual’s analysis of benefits over costs. Their experimental results indicate that incentives are essential to information

contribution and sharing. Focusing on technologies that facilitate information sharing, Fulk, Flanagan, Kalman, Monge, and Ryan (1996) identify two functions of such technologies as providing collective goods: connectivity and communality. Connectivity functions by linking members together, and communality allows sharing a body of information. They contend that the realization of connective and communal goods is decided by the relation between costs and benefits to the users.

Rationality is in the center of the utilitarian perspective, which, however, has long been critiqued when being used to understand organizational behavior in general (see Cyert & March, 1992; March & Simon, 1964). Simon (1957) proposes the concept of bounded rationality, which not only indicates that organizational members are cognitively limited but also suggests the existence of nonrational processes that undermine the rational assumption. In organizational communication, theoretical developments and empirical research on organizational culture (e.g., Alvesson, 2002; Martin, 2002) and control (e.g., Deetz, 1998; Tompkins & Cheney, 1985), for instance, have demonstrated the working of these nonrational processes. These studies have revealed that value systems constituted in communication function to direct organizational members' decision-making behavior (see further discussion in the following section). Therefore, research on information contribution to shared resources is limited when it is constructed only on the rational utilitarian perspective and focuses just on the process of costs-benefits analysis.

Instead of rejecting rationality, we take rationality in its bounded sense and propose that the utilitarian perspective be understood as one of the dimensions in understanding information contribution to shared resources instead of the only dimension. Its inclusion in our framework is based on two reasons. First, previous theoretical and empirical work in both communication and other areas as reviewed above suggests that the utilitarian calculation of benefits and costs explains a portion of variance of collective action (Connolly & Thorn, 1990; Hardin, 1982). Second, everyday organizational experience also seems to confirm the role of self-interests in organizational decision making.

Recognizing the existence of nonrational organizational processes urges us to identify other dimensions besides the utilitarian one. Studies of organizational culture, motivation, and control all point to a normative perspective about individuals, which underlies OI as the key organizational process. In the following section, we will examine the normative perspective and the role of OI in influencing employee contribution to shared resources.

A Normative Perspective and OI

A normative perspective believes that organizational members often make decisions guided by or based on values and cultural norms with which they identify themselves. We argue that this normative perspective is indispensable to understanding employees'

information contribution to electronic databases. Research in work motivation and organizational commitment (e.g., Robertson & Tang, 1995; Shamir, 1990; Staw, 1984), organizational culture (e.g., Martin, 1992, 2002; Ouchi, 1981; Schein, 1985), control (e.g., Alvesson, 2000; Deetz, 1998; Tompkins & Cheney, 1985), and communities of practice (e.g., Brown & Duguid, 1991; Iverson & McPhee, 2002; Vaast, 2004; Wenger, 1998) all suggests that collective action is partly a result of identification mediated by organizational values and norms.

From the perspective of industrial psychology, Staw (1984) and Shamir (1990), and Shamir, House, and Arthur, (1993) indicate that identity and identification might be an intrinsic human need and critical for us to understand people's prosocial behavior. For instance, Shamir (1990) argues that people are "motivated to contribute to collective work efforts because by doing so they will maintain and affirm relevant identities" (p. 325). Considering altruism as an intrinsic human inclination, Staw proposes an altruistic model of collective motivation in which identification with an organization is accentuated as the link between an individual and the organization.

Research in organizational culture (Kotter & Heskett, 1992; Martin, 1992; Ouchi, 1981; Schein, 1985) has shown that value-based decision making functions to reconcile potential conflict of interests between individuals and their organizations. Identification is the very process in which corporate values are inculcated in the minds of individual employees through various means (Tompkins & Cheney, 1983). Cultural values serve as normative principles for employees to make day-to-day decisions in the interest of an organization. The functioning of an organizational culture depends on, and further contributes to, the production of organizational identity—"the perception of oneness and belongingness" to an organization (Ashforth & Mael, 1989).

In addition, research on unobtrusive control supports the critical role of identification in collective actions. Unobtrusive control has been identified as a dominant form of control in organizations, under which employees voluntarily make their decisions in accord with an organization's interests (Tompkins & Cheney, 1985). Identification is noted as the primary means for unobtrusive control to happen. Citing Barnard (1968) and Simon (1976), Tompkins and Cheney (1985) state,

The individual acquires an "organization personality"; he or she finds an area of acceptance within which he or she will assume the "role" of the organization, accepting the values and factual premises of the organization as relevant to on-the-job decisions. (p. 191)

When discussing the role of communities of practice in organizational learning, Wenger (1998, 2000) specifically addresses the relationship between information sharing and identity. Communities of practice, according to Wenger (2000), refer to "groups of people informally bound together by shared expertise and passion of a joint enterprise" (p. 139). Although he does not talk about information contribution to electronic databases specifically, Wenger (1998) states that spreading information in a community of practice is a form of engagement and declaration of allegiance to

a community. Information contribution is not only an act of sharing or exchanging resources but also a symbolic one that forges and maintains a relationship between an individual and a collective. Participation and identity constitute each other. Electronic databases are just part of what Wenger (1998) calls “shared repertoire,” not unlike other resources such as stories and routines of a community of practice.

In a recent study, Vaast (2004) reveals how the use of intranet technology and a sense of common organizational membership mutually constitute each other. By contributing and sharing an improvised work procedure, for instance, organizational members follow the norm of mutual accountability and declare and affirm their relationship with the organization. The information contributed, stored, and shared in intranet databases becomes a shared repertoire for participating organizational members. Hence, information contribution to electronic databases should not be simply reduced to a utilitarian act. It is a symbolic one infused with relational and affective meanings.

Research in technology adoption has begun to show that the utilitarian and normative perspectives are not competing theories but complementary and compatible. In a study of the introduction and use of video telephone systems in a company, Kraut, Rice, Cool, and Fish (1998) find support for both utilitarian and normative explanations of the patterns of use and suggest that both are necessary in model construction.

By now we have shown that both the utilitarian and normative perspectives are necessary conditions in understanding employees’ willingness to contribute to shared resources. They are two coexisting, rather than opposing, dimensions. In addition to them, we propose a third perspective—a collaborative dimension. The following section will discuss the rationale and the corresponding organizational process that this perspective underlies.

A Collaborative Perspective and Collaborative Experience (CE)

First, information contribution to electronic databases is not only a collective action but also a collaborative one. A collective action refers to any activity directed at the provision of collective goods (Marwell & Oliver, 1993). It can be donations to an environmental cause or contributions to public park systems. It is a collection of individual actions. However, a collaborative action emphasizes cooperation and coordination. It involves sharing resources and responsibility and creating shared meaning (Schrage, 1995). Based on distributed cognition theory (Hutchins & Klausen, 1998; Rogers & Ellis, 1994) and activity theory (Engeström, 1999), collaboration is constituted by the dynamic interaction among both human agents and technological artifacts and tools.

Information contribution and maintenance of an electronic database is part of the collaboration process among organizational members. An electronic database is not a simple aggregate of every individual’s contribution of information. Instead, one’s

contribution has to be written, collected, assessed, accepted or rejected, revised, and frequently updated. Levels of interaction among the collaborative parties can range from simple to complex depending on the complexity of the shared information.

Second, the collaborative dimension is an experiential one. It does not mean that an individual is assumed to be collaborative in nature. Rather, it refers to an assumption that individual decisions regarding collaborative actions, such as information contribution, are partly based on their previous CE, given the pervasiveness of collaborative work in today's organizations. This dimension is rooted in a phenomenological view of individuals whose psychological or subjective feelings are constituted by their experience of the world (Husserl, 1962). In this case, it is the experience of collaborative work. For instance, in their study of the use of groupware Lotus Notes, Vandenbosch and Ginzberg (cited in Vaast, 2004) find that the primary users of the groupware tend to be those who collaborated in previous projects.

Collaborative work takes place within both team arrangements and growing communities of practice, the two of which, sometimes, overlap or coincide. First, traditional hierarchical bureaucracies are increasingly replaced by, or transformed into, matrix organizations or various forms of flatter organizations composed by teams of various types (Donnellon & Scully, 1994). Team and teamwork have become common organizational parlance. According to LaFasto and Larson (2001), "The movement to collaborative teamwork has been one of the sea changes that have swept through organizations during the last two decades of the twentieth century" (p. xi).

Collaboration is an important aspect of communities of practice (Brown & Duguid, 1991; Iverson & McPhee, 2002; Wenger, 1998) that exist within and across organizations. According to Wenger, "Membership [of a community] is not just a matter of social category, declaring allegiance, belonging to an organization, having a title, or having personal relationships with some people" (p. 74) but a matter of dense relations formed in mutual engagement around what they do. Formal and informal collaboration constitutes and sustains a community. A study by Heaton and Taylor (2002) demonstrates how two software engineering teams as two communities of practice each collaborate in their own ways to sustain their communities in the very process of generating and sharing knowledge. By examining communities of practice across various industries, Lesser and Storck (2001) reveal that many communities maintain some form of centralized electronic databases and collaboration among community members keeps the databases fresh to the users.

In sum, CE has become a major portion of people's work experience in today's work environment. We argue that organizational members' experience from collaborative projects is a vital source for their future decision in other collaborative contexts, in this case information contribution to shared electronic databases.

Based on the above discussion of the three perspectives and their related key organizational processes, we propose an additive model in which the willingness of employees to contribute to shared electronic databases (WEC) is predicted by employees' perceived benefits (PB) derived from the utilitarian dimension, OI from the normative dimension, and CE from the collaborative dimension (see Figure 1).

WEC is the behavior intention of organizational members, instead of the actual behavior. Prior research of technology adoption and use has shown that behavioral intention significantly predicts the actual behavior (Hill, Smith, & Mann, 1987) and is a reasonable indicator of actual technology use (C. M. Jackson, Chow, & Leitch, 1997). Therefore, we hypothesize the following:

Hypothesis 1 (H1): Each main effect of the additive model, PB + OI + CE, on WEC will be significant.

Method

Research Site and Participants

Industrial Corp. (pseudonym is used throughout this article to protect confidentiality) is an international company headquartered in the United States. The company is a worldwide leader in manufacturing motion and control products across a variety of markets from commercial and industrial to aerospace, with annual sales exceeding \$6 billion. Recently, realizing the critical role of organizational knowledge in maintaining its market competitiveness, the company was actively evaluating potential knowledge management strategies including launching a shared electronic database. Within this context, the management commissioned a study to assess the organizational readiness for the use of a shared electronic database. Data of the present study are part of the data set from this larger readiness study sponsored by the company.

Participants in this study consisted of the U.S.-based field sales force in one of Industrial Corp.'s product groups. Members of the sales force were first directed through e-mail to a Web site where an online survey was posted. The response rate was 80% ($N = 80$). Tenure of respondents ranged from less than 1 year to more than 21 years. The respondents were predominantly male (90%). Among the respondents, 75% were sales territory managers or account managers, and the rest included marketing specialists and engineers supporting the field sales force.

Online Survey

We conducted an online survey. The Web site of the university with which we were affiliated hosted the survey. The method allowed us to easily access participants dispersed across the country. It also effectively protected participants' anonymity (Best & Krueger, 2004). The survey started with a statement, informing participants that Industrial Corp. considered creating a centralized, shared electronic database called Virtual Memory Bank, to which employees would make submissions of their information and which would be accessible to current and future employees.

The online survey consisted of several measurement instruments. The most relevant to the present study were the four scales assessing our criterion variable—WEC and the other three predictor variables, which were PB, OI, and valence of CE (see the appendix).

We constructed a scale of three items to measure the criterion variable WEC. To fit the context of a sales force, we operationalized work information into that about customers, competitors, and sales strategies. An example of such items is “I would be willing to submit what I know about my customers and competitors to such a databank.” Participants responded on an 11-point scale from 0 (*completely disagree*) to 10 (*completely agree*).

We created a scale of four items to measure PB. The benefits were operationalized as perceived increase of work performance and job effectiveness. Examples include “I believe that the sharing of information concerning our customers would help me perform my job better” and “I think my performance would improve by consulting such a databank.” Participants reported on an 11-point scale from 0 (*completely disagree*) to 10 (*completely agree*).

To measure OI, we constructed a scale of six items, three of which we adopted from Cheney’s (1983) Organizational Identification Questionnaire (e.g., “I talk up [Industrial Corp.] to my friends as a great company to work for”). Cheney’s conceptualization of OI stresses the role of communication as the mechanism by which employees are induced into accepting organizational values and goals (V. D. Miller, Allen, Casey, & Johnson, 2000). Although agreeing with Cheney, we argue that job autonomy, self-efficacy, and satisfaction are also important ingredients in producing OI. As we discussed earlier, identification and practice are mutually constituted. How self-efficacious they are and how they feel about their job constitute identification at the organizational level. As a result, we created three additional items regarding their self-efficacy and satisfaction (e.g., “My opinions count at [Industrial Corp.]”). Participants responded on an 11-point scale from 0 (*completely disagree*) to 10 (*completely agree*).

A scale of eight items measured CE. We included items regarding (a) employees’ experience in a collaborative process (e.g., “My co-workers have withheld information from me for personal gain”), (b) experience of collaboration outcomes (e.g., “I’ve had negative outcomes in the past while working on a team at [Industrial Corp.]”), and (c) affective items toward collaboration based on their experience (e.g., “I feel I can count on my co-workers to help me whether I ask for it or not”). Participants reported on an 11 point scale from 0 (*completely disagree*) to 10 (*completely agree*).

Data Analysis

Data analysis went through three preliminary steps and two primary steps by using SPSS 12.0. First, we performed reliability analysis (Cronbach’s α) and deleted distracting items based on item-total statistics. Second, as an important assumption

Table 1
Scale Reliabilities (Cronbach's α)

Scale	Before Modification		After Modification		Number of Items Deleted
	Scale α	Number of Items	Final Scale α	Number of Items	
WEC	.82	3	.88	2	1
PB	.74	4	.75	3	1
OI	.86	6	.86	6	0
CE	.66	8	.66	8	0

Note: WEC = Willingness of employees to contribute to shared electronic databases; PB = perceived benefits; OI = organizational identification; CE = valence of collaborative experience.

for multiple regression analysis, normality of individual variables was checked by a modification of the Kolmogorov-Smirnov test (Hair, Anderson, Tatham, & Black, 1998). Transformation was applied to remedy non-normality. Third, missing values were substituted by the mean values of variables. The missing values only accounted for 1.13% of the data set. The two primary steps include, first, a hierarchical regression to test the hypothesis and, second, a check of redundancy among predictor variables based on multicollinearity statistics.

Results

First, reliability tests revealed distracting items in the scales of WEC and PB. Based on item-total statistics, we modified the scales by deleting these items. Table 1 summarizes the reliabilities (Cronbach's α) of the measurement scales before and after modification. Scales after modification were used for subsequent data analysis.

Table 2 presents the descriptive statistics and correlation matrix of the five variables. A modification of Kolmogorov-Smirnov tests (Hair et al., 1998) and visual check (histograms and normal probability plots) were both used to identify non-normality of individual variables. Only one variable OI was non-normally distributed (negatively skewed). The distribution became normal after a square transformation.

We tested the hypothesis using hierarchical regression. Existing research indicates that employees' organizational tenure is significantly associated with their information-giving behavior (Kramer, Callister, & Turban, 1995; also cited in Jablin, 2001), value identification (Cha & Edmondson, 2006), organizational commitment (Allen & Meyer, 1993), and voluntary learning (Birdi, Allan, & Warr, 1997). To test effects over and above the potential influence of organizational tenure, we want to include it as a control variable. So organizational tenure was first entered as Block 1, and the predictor variables as Block 2 were then entered stepwise. Significance level, p , was set at .05.

Table 2
Means, Standard Deviations, and Correlation Matrix

	<i>M</i>	<i>SD</i>	WEC	PB	OI	CE	Tenure
WEC	15.33	3.59	—	.45***	.30**	.24*	-.18 ^a
PB	20.00	5.54		—	.12	.04	-.13
OI	47.49	8.50			—	.11	.05
CE	53.14	10.58				—	.26*
Tenure	4.66	1.91					—

Note: $N = 80$. Pearson's correlation coefficient r . WEC = willingness of employees to contribute to shared electronic databases; PB = perceived benefits; OI = organizational identification; CE = valence of collaborative experience.

a. $p = .056$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

H1 proposes that each of the three predictor variables has significant main effect on the criterion variable WEC. Regression analysis showed that, controlling for the effect of organizational tenure, each predictor was entered into the model, predicting a significant portion of the variance of WEC (see Table 3). Interestingly, PB explained the largest portion of variance, $\Delta R^2 = .18$, $p < .001$, followed by CE, $\Delta R^2 = .07$, $p < .01$, and OI, $\Delta R^2 = .06$, $p < .05$. The results indicated that controlling for tenure, the model showed a significant overall effect, $\Delta R^2 = .36$, $F(3, 75) = 14.27$, $p < .001$. Therefore, H1 was supported.

In addition, a test of multicollinearity was conducted. The results showed very low redundancy or collinearity among independent variables.

Discussion

Organizational use of shared electronic databases is often undermined by employees' unwillingness to contribute discretionary information (Connolly & Thorn, 1990). Previous studies on collective action and motivation assume individuals to be either utilitarian or normative. The former (e.g., Marwell & Oliver, 1993) produces calculative models focusing on costs-benefits analysis regarding personal welfare. The latter emphasizes organizational norms as the major motivator and predictor that connect individual contribution to organizational welfare (e.g., Staw, 1984). We propose that, in organizational contexts, the utilitarian calculation and normative orientation, instead of being two opposing perspectives, coexist as two dimensions in the process of collective action. In addition, the study proposes a collaborative dimension. By *collaborative* we do not mean that individuals are inherently collaborative. Rather, we argue that CE is a predominant organizational experience of employees today and that the valence of their CE will affect their decision making in organizational affairs.

Table 3
Summary of Hierarchical Regression Analysis
for Variables Predicting WEC

	β	ΔR^2	R^2	Adj. R^2	F
WEC					
Step 1: Control					
for tenure	-.18	.03	.03	.02	2.59
Step 2: PB	.43	.18***	.21	.19	17.80
Step 3: CE	.28	.07**	.28	.26	7.46
Step 4: OI	.24	.06*	.34	.31	6.35

Note: $N = 80$. WEC = willingness of employees to contribute to shared electronic databases; PB = perceived benefits; CE = valence of collaborative experience; OI = organizational identification.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Contribution to shared electronic databases is not only collective—aggregate of individual actions—but also collaborative, involving coordination and cooperation. We propose that the three dimensions be entered into analysis simultaneously to predict employees' willingness to contribute to shared electronic databases. We empirically tested our hypotheses in a large industrial organization.

Key Findings

Results suggest several key findings. First, results from a hierarchical regression analysis support our prediction that each dimension could predict a significant portion of variance regarding employees' willingness of information contribution. Among the three dimensions, the utilitarian one demonstrates a much stronger effect on the criterion variable than do the other two. To a certain extent, this result lends support to Hardin's (1982) conclusion that individuals' rational calculation often explains a large portion of collective action, although his conclusion was made on such public issues as environmental movement and gun control. It is consistent with research findings on information sharing grounded in theories of social dilemma and collective action (e.g., Bonacich & Schneider, 1992; Connolly & Thorn, 1990).

What is interesting, however, is that the large effect resulting from the utilitarian dimension does not obscure the effects from the other two dimensions. This finding offers empirical evidence to the argument that identification and collaboration are especially important in work contexts in comparison with public issues, the latter of which are often studied by theorists of collective action (Hardin, 1971, 1982; Marwell & Oliver, 1993; Olson, 1965). Unlike public collective actions such as a donation drive for a public park, employees in work organizations perform their roles both formally and informally by routinely interacting with their coworkers.

Such routine interactions constitute employees' identification process and CE, which further exert influence on their contribution to collective goals.

Second, by aligning theories and research previously considered incompatible or separate, this study contributes to the literature with a multitheoretical perspective (Monge & Contractor, 2003). The significant effects from all three dimensions demonstrate that organizational members, when making decisions about contributing information to shared resources, are not self-interested "economic men" who calculate every move based on costs-benefits analysis, nor are they those brain-washed "organizational men" who always put organizational interests before their own. The analysis suggests that models based on any single-dimensional view would lose sight of the complexity of organizational behavior and reduce prediction accuracy.

Third, by introducing a collaborative dimension, this study contributes to the modeling of resource sharing supported by electronic databases. The results of this study indicate that CE of organizational members has a significant effect on employees' decision of information contribution. Unlike the utilitarian or normative dimension, collaboration accentuates the dynamic nature of social interaction built on trust, reciprocity, and mutual accountability. This dimension resonates with the emphasis on mutual engagement in developing communities of practice (Wenger, 1998). For Wenger (1998), mutual engagement provides the condition under which a shared repertoire of information and knowledge naturally emerges. Electronic databases become instruments in which part of the shared repertoire is held for a collaborative work community.

Fourth, the results suggest that the three dimensions are quite independent from each other. The lack of redundancy indicates that each dimension stands as a unique force that exerts influence on the criterion variable. This finding confirms our theoretical discussion earlier that each dimension comes from a distinctive theoretical perspective about human behavior and a unique organizational process. The three dimensions are complementary in providing a rounded picture of the phenomenon.

In sum, the results support the additive model based on the three-dimensional framework. As we acknowledged earlier, our study has no intention to exhaust all the potential dimensions or predictors. Instead, the model provides a heuristic, multi-theoretical framework, based on which more comprehensive models can be constructed and tested in the future.

Limitations and Directions for Future Research

In spite of the significant findings discussed above, the study has several areas that could lead to improvement in the future. First, as a heuristic, multitheoretical framework, the additive model in the present study does not preclude the possibility of adding more dimensions and predictors through future research. For instance,

shared electronic databases often take the form of sophisticated information systems. Research has shown that what a technology is and does is subject to social construction and negotiation (M. H. Jackson, Poole, & Kuhn, 2002; Slack, 1989; Winner, 1977). Each of the three existing dimensions of our model could potentially influence employees' interpretation of a technology and alter its managerial meaning. We suggest that future research examine how a technology dimension could be integrated into the model.

Second, although acceptable as a measure in its exploratory stage, the reliability of the measurement instrument for CE is unsatisfactory ($\alpha = .66$). The scale certainly demands further development. In addition, as we know, work collaboration takes place in different forms at different levels (Hara, Solomon, Kim, & Sonnenwald, 2003). Future research can advance the collaborative dimension by exploring the role of these factors in predicting information-sharing behavior. Third, the focus of the present study is on behavioral intention, instead of the actual behavior. As a result, the research findings have to be understood at the attitudinal level. How the three dimensions are associated with the actual behavior warrants further empirical research.

In addition, the findings of this study are based on the case of a nationally distributed sales force in one organization. The distinct nature of a sales profession and the relatively small sample size certainly limit the generalizability of our results. We suggest that future empirical studies examine and develop the proposed model in a variety of organizational contexts and professions.

Practical Implications

The present study has several direct implications for initiatives that intend to promote information contribution to shared electronic databases (see Table 4). We will start with the implications we draw from each of the three dimensions. First, the utilitarian dimension suggests that employees do calculate their personal gains and losses when making decisions to share information at work. It bears the largest effect on the behavior intention of information contribution. As a result, it is necessary to have an effective incentive system geared toward promoting information contribution, on one hand. On the other, organizations should strive to reduce the costs incurred in the process of information contribution by properly compensating time involved and providing necessary tools, training, and procedures.

Second, an initiative aiming at information contribution by employees has to be coordinated with an organization's strategic and cultural activities aiming at identification. For instance, studies on vision and mission communication (Martin, 1992; Tichy & Devanna, 1986) have shown that a well-communicated vision and mission are critical in creating a culture in which organizational constituents embrace organizational future, values, and purposes as their own. Leaders of an organization should pay attention to the content, articulation, and implementation of vision and

Table 4
Practical Recommendations to Promoting
Information Contribution to Shared Electronic
Databases Based on the Three-Dimensional Framework

Dimensions	Organizational Processes	Practical Recommendations	
		Single-Dimensional Efforts	A Holistic Strategy
Utilitarian	Costs-benefits analysis	Incentive structure; career development plan	Coordinating and integrating efforts of the three dimensions
Normative	Identification	Vision and mission communication; participation in decision making	
Collaborative	Collaboration	Building effective teamwork; nurturing communities of practice	

mission to generate identification. In addition, employees' welfare has to be an essential part of the vision and mission. As Shamir et al. (cited in Fairhurst, 2001) indicate, leaders should connect with constituents' positive worth and efficacy as individuals and as a collective.

Fundamental to identification is the extent to which employees are involved in decision-making processes. Research has lent strong support to the connection between participation and its consequences including identification (Locke & Schweiger, 1979; K. I. Miller & Monge, 1986; Monge & Miller, 1988; Seibold & Shea, 2001). As McLagan and Nel (1995) observe, organizational governance is transitioning into an age of participation. A participatory decision-making process has to replace the traditional chain of command to engender a higher level of identification and, as a result, information-sharing behavior.

Third, a collaborative dimension in our model underscores positive CE that comes from effective team collaboration in employees' everyday work life. To create positive CE, first, organizations have to invest in building effective teamwork through training. Training encompasses team communication competency, relationship management skills, effective problem-solving skills, and leadership skills (LaFasto & Larson, 2001). Second, organizations should cultivate and support the development of their communities of practice (Wenger, 2000). As discussed earlier, in communities of practice, collaboration will help develop a sense of joint enterprise and a shared repertoire. Trust, reciprocity, and mutual accountability will naturally allow information contribution and sharing to take place.

Finally, we want to emphasize that an organization has to pursue a holistic strategy, which is to coordinate the efforts that target each dimension to successfully solve the problems such as information undersupply or underutilization of shared resources. A holistic strategy requires leaders of the initiative to see the interrelationship among different efforts. For instance, vision communication has the potential to not only enhance the level of identification but also promote enterprise-wide thinking among employees' decision making. Enterprise-wide thinking should be incorporated into various training programs including teamwork training. As a result, vision communication could have an impact on teamwork across unit boundaries and on enterprise-wide collaboration. As another example of this holistic strategy, the redesign of an incentive structure targeting the utilitarian dimension should incorporate the goal of producing positive collaboration experience and results. An incentive structure for information contribution has to balance the needs between individual-oriented inducement and incentive oriented toward group performance (collaboration). In sum, a holistic strategy calls for an integration of the single-dimensional efforts.

Appendix

Measurement Instruments

Use a 0-10 scale to indicate how much you agree with each of the following items, with 0 meaning you completely disagree, 5 neutral, and 10 you completely agree.

Willingness of Employees to Contribute to Shared Electronic Databases

1. I would be willing to submit what I know about my customers and competitors to such a databank.
2. I would be willing to submit sales strategies that I've learned to such a databank.
3. I believe I have useful knowledge to contribute to such a project.^a

Perceived Benefits

1. I could be more effective if I were aware of my customers' dealings with multiple divisions and territory managers from other groups.^a
2. I believe that the sharing of information concerning our customers would help me perform my job better.
3. If we had an online forum to discuss problems and solutions among co-workers, it would enhance our performance.
4. I think my performance would improve by consulting such a databank.

Organizational Identification

1. My opinions count at [Industrial Corp.].
2. I'm pleased with my job at [Industrial Corp.].
3. I feel rewarded for contributing to my group's success.

4. I'm proud to work for [Industrial Corp.].
5. I talk up [Industrial Corp.] to my friends as a great company to work for.
6. In general, I view [Industrial Corp.'s] problems as my own.

Collaborative Experience

1. I am regularly asked for my opinion by co-workers regarding products, clients, or competitors.
2. I've had negative outcomes in the past while working on a team at [Industrial Corp.].
3. My co-workers have withheld information from me for personal gain.
4. I feel I can count on my co-workers to help me whether I ask for it or not.
5. There are always people on teams who don't work well with others.
6. Too many co-workers are protective of their own unique knowledge about customers, competitors, and the marketplace.
7. Consulting with co-workers slows me down.
8. I have witnessed a sale being lost because information was not shared.

a. Based on reliability analysis, these items were deleted in data analysis.

Note

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