

# To Share or Not to Share: Modeling Tacit Knowledge Sharing, Its Mediators and Antecedents

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**ABSTRACT.** Tacit knowledge sharing discussed in this study is important in the area of business ethics, because an unwillingness to share knowledge that may hurt an organization's survival is seen as being seriously unethical. In the proposed model of this study, distributive justice, procedural justice, and cooperativeness influence tacit knowledge sharing indirectly via two mediators: organizational commitment and trust in co-workers. Accordingly, instrumental ties and expressive ties influence tacit knowledge sharing indirectly only via the mediation of trust in co-workers. The model is assessed by using data from different companies' employees, who attend an evening college in Taiwan for advance study. The test results of this study indicate that tacit knowledge sharing is affected by distributive justice, procedural justice, and cooperativeness indirectly via organizational commitment. Additionally, tacit knowledge sharing is also affected by distributive justice, instrumental ties, and expressive ties via trust in co-workers. The paths from procedural justice and cooperativeness to trust in co-workers are shown to be insignificant. Managerial implications of the empirical findings are also provided.

**KEY WORDS:** Knowledge management, organizational commitment, trust in co-workers, justice, cooperativeness

## Introduction

Knowledge can be viewed as an icon of the new global economy and has achieved such prominence owing to its critical position in terms of global and national economic growth. Identified as individuals sharing relevant experiences and information with other organizational members, knowledge sharing is appropriately assumed to be an ethical behavior (Wang, 2004) – that is, the willingness to share knowledge with others may be regarded as a proxy for recognition to a certain system of moral standards or values (Wang, 2004). Despite the increasing ease of use of having access to online information, employees still must count on their co-workers for knowledge sharing in order to efficiently deal with their work due to a dramatically changing market.

It has been indicated that knowledge sharing is a precious intangible resource that holds the key to competitive advantage (Desouza, 2003). Considered as a form of ethics, knowledge (or information) sharing has become a kind of daily interaction common to many business settings (Chismar, 2001; Weiser, 1988). It has been even further indicated that an effective ethics program concerns the sharing of knowledge (or information) regarding often thorny questions of human behavior and shifting values (Gentile, 1998).

Given that the rationality of the bygone economic regime and the current knowledge economy are no longer comparable, the conceptual framework serving the previous economic regime needs to be replaced with something different (Styhre, 2002). Instead of re-enacting the ethics of contracting primarily aimed at safeguarding personal interests, the knowledge-based economy is founded on the ethics of sharing (Styhre, 2002). Whereas knowledge sharing makes an

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organization become more competitive in the market, the unwillingness towards knowledge sharing should be regarded as an important ethical issue due to its impact upon organizational survival. Given that the effective management of this resource is one of the moral challenges to today's organizations, determining which factors promote or impede the sharing of crucial knowledge within an organization constitutes research areas for both ethics and knowledge management (Van den Hooff and Van Weenen, 2004). Indeed, although knowledge sharing has drawn little attention in the area of ethics within previous research, it does deserve, however, a thorough examination beyond the typical issues covered in business ethical codes given that knowledge sharing itself already implies an implicit ethical discipline. Specifically, when it comes to tacit knowledge sharing in a business organization, those employees who refuse to practice such sharing (which is encouraged in the organization) are perceived as latently unethical (Wang, 2004).

The post-industrial society is centered on the use of intangible intellectual capital and knowledge (Styhre, 2002). As such, there exist different levels of knowledge that have been recognized as being a part of business organizations' knowledge resources (Selamat and Choudrie, 2004). The thorny form of knowledge (in terms of understanding or learning) is tacit knowledge, which is the most transparent and subjective form of knowledge (Selamat and Choudrie, 2004). Hence, predicting the attempt to share tacit knowledge is seriously recognized as a critical issue to both academia and the business community.

The attempt for tacit knowledge sharing may be defined as part of the attitude toward pro-social organizational behaviors. A pro-social attitude captures the general propensity of people anticipating good consequences not only for themselves, but also for their co-workers and organization (Brief and Motowidlo, 1986). Tacit knowledge sharing has undoubtedly become a common desired objective of management in business organizations (Desouza, 2003). Many organizations have tried utilizing reward systems to stimulate employees to share knowledge with their co-workers, however, as suggested by Jarvenpaa and Staples (2001), pro-social behaviors of knowledge sharing are above and beyond those prescribed by job descriptions, are voluntary in nature, and cannot be explicitly or directly rewarded, because of its intangibility (Desouza,

2003; Jarvenpaa and Staples, 2001). Therefore, rather than emphasizing a tangible influence of rewards, this research offers an exploration of other intangible alternatives that may directly constrain or support an individual's tacit knowledge sharing in an organization.

The purpose of this study is to provide a theoretical understanding on the framework for tacit knowledge sharing that is developed using organizational commitment and trust in co-workers as the critical mediators. This is built from the widely accepted assumption that the success of knowledge management initiatives is likely to be highly dependent upon having workers who are willing to share their knowledge (Hislop, 2003). While there have been tentative suggestions that organizational commitment may substantially affect the willingness of employees to share tacit knowledge (Hislop, 2003), little research has been done on this area. Despite the importance of the topic of knowledge sharing in ethics, discussions related to tacit knowledge sharing have still been characterized by vague terminology, hand waving, and a frequently heard refrain that it is all about the culture (Levin et al., 2002). Therefore, in response to such inappropriate discussions about tacit knowledge sharing, our central research objective is to establish a rigorous understanding to the formation, mediators, and antecedents of knowledge sharing by opening a black box of tacit knowledge sharing, eventually helping to achieve the success of an organization's tacit knowledge sharing.

This study differs from previous works in two important ways. First, this study offers a theoretical understanding on the conceptual model regarding the formation of organizational commitment, trust in co-workers, and tacit knowledge sharing by simultaneously considering organization-person influence, personal influence, and interpersonal influence as exogenous impacts. In this way, management is able to learn how to precisely encourage tacit knowledge sharing from a broader horizon rather than a few narrow focal points. Second, in addition to tacit knowledge sharing established from the social perspective, social networks (e.g., instrumental ties, expressive ties) have also deep roots in social theory (Manev and Stevenson, 2001). While tacit knowledge sharing and social networks are both associated with the social theory, there has been little attention

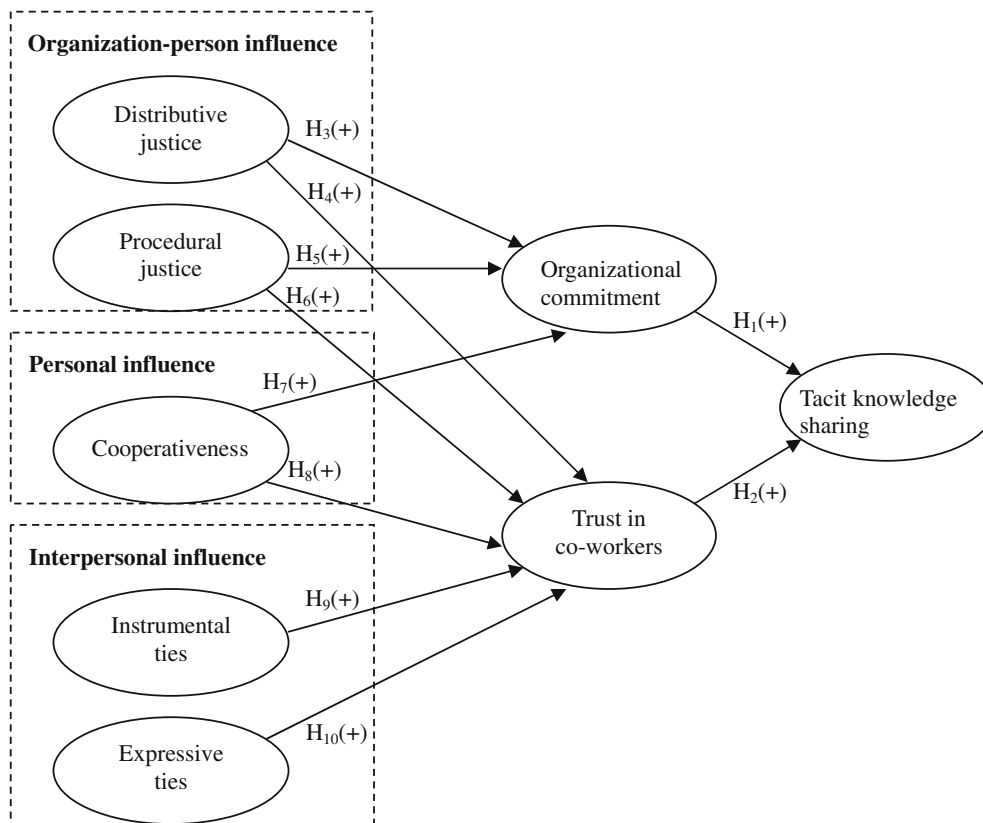


Figure 1. Conceptual model.

paid on the relationships among them. Consequently, this study is the first to enhance the understanding of the perceptual tacit knowledge sharing by linking up with the social network.

### Research framework and hypotheses development

The research model as displayed in Figure 1 contains organization–person, personal, and interpersonal influences, which affect tacit knowledge sharing through the mediation of organizational commitment and trust in co-workers. More specifically, in the proposed model, distributive justice, procedural justice, and cooperativeness all influence tacit knowledge sharing indirectly via both organizational commitment and trust in co-workers, while instrumental ties and expressive ties influence tacit knowledge sharing indirectly only via trust in co-workers. Previous empirical findings reveal that the ethics of sharing is an important trait of the knowl-

edge economy (Styhre, 2002). Accordingly, previous research also notes that when examining the practices of knowledge-intensive organizations in a developed country, the ethics of sharing underlying the use of all tacit knowledge needs to be recognized from a sharing perspective rather than an exploitative perspective conceived of knowledge as being an organizational resource (Styhre, 2002).

It is important to note that this study's proposed model is specific to tacit knowledge sharing rather than just explicit knowledge sharing in general, given that these two types of sharing take up critically different factors. For instance, one may be likely to share general information and knowledge with colleagues while hesitating to guide them with job tips or influential knowledge that could affect one's importance in the organization. Albeit relational variables such as shared values (Morgan and Hunt, 1994), communication quality (Anderson and Narus, 1990), and expectations about the future behaviors of role partners (Wiener and Doescher, 1994) have been discussed to influence individuals'

behaviors in an organization, the most prominent relational factors are trust and commitment (Morgan and Hunt, 1994). Indeed, trust in co-workers and organizational commitment are the key ingredients for distinguishing social exchange from purely economic exchange (Yilmaz and Hunt, 2001).

#### *Organization commitment and tacit knowledge sharing*

There exists today only a small number of studies that have examined organizational commitment from an ethical perspective (Cullen et al., 2003). Even though organizational commitment has interested researchers due to its positive effects on business organizations, relatively little has been known about the effects of the ethical context on organizational commitment (Cullen et al., 2003). As such, this study contributes to the literature on organizational commitment by assessing its mediating effects on tacit knowledge sharing, which represents an ethical outcome in knowledge management.

The strength of an employee's identification with and involvement in a particular organization is seen as organizational commitment (Porter et al., 1974), which is also characterized by a positive response toward co-workers who form the organization (Becker, 1992). Views of organizational commitment have frequently highlighted the notion as an affective response to the organization as a whole rather than to any specific context (Farmer et al., 2003). Based on the organization theory, organizational commitment has been reported as an important variable in explaining knowledge sharing in quite a number of studies (Jarvenpaa and Staples, 2001; Van den Hooff and Van Weenen, 2004). Positively related to individuals' willingness to commit extra effort to their workplace job (Meyer and Allen, 1997), organizational commitment is accordingly expected to be linked to willingness to donate and receive knowledge (Van den Hooff and Van Weenen, 2004). It is also supported by O'Reilly and Chatman (1986) and Van den Hooff and Van Weenen (2004) that the nature and pattern of individual behavior on knowledge sharing is influenced by the individuals' commitment to their immediate organizations.

Individuals who have a feeling of emotional attachment to their organization are likely to share their knowledge whenever they realize that they

share their knowledge in an environment where doing so is appreciated and where their knowledge will be actually used and eventually be beneficial to their organization (Hall, 2001; Van den Hooff and Van Weenen, 2004). Given that individuals who are strongly committed to their organization may attach substantial importance to their organizational membership and to their relationship with other members (O'Reilly and Chatman, 1986), individuals' organizational commitment is likely to facilitate their intentions of tacit knowledge sharing with other members, which may benefit their organization in the long-run horizon. For instance, it was reported that organizational commitment is strongly linked to sales force contexts with various supportive spirits (e.g., tacit knowledge sharing), including those directed to co-workers (MacKenzie et al., 1998), indicating that organizational commitment may be significantly related to tacit knowledge sharing with others, which reflects a crucially supportive context. The phenomenon may be further supported by Jarvenpaa and Staples (2001) that strong organizational commitment engender beliefs that the organization has the right to the information and knowledge one has created or acquired. Thus, the hypothesis is stated as follows:

*H<sub>1</sub>: Organizational commitment is positively related to tacit knowledge sharing.*

#### *Trust in co-workers and tacit knowledge sharing*

Being important from an ethical aspect (García-Marzá, 2005), trust is an expression of faith and confidence that a person or an institution will be fair, reliable, ethical, competent, and non-threatening (Caldwell and Clapham, 2003; Carnevale, 1995). Accordingly, individuals' trust in their co-workers stems from the perceptions of their interaction qualities with co-workers such as ethics, morality, integrity, reliability, and competence (García-Marzá, 2005; Morgan and Hunt, 1994). The area of trust in organizational relationships has been increasingly developed in organization theory (Brockner and Siegel, 1996). Plenty of research in this area deals with the facilitating role trust plays in inter- and intra-organizational cooperation including knowledge sharing (McAllister, 1995). Trust is also emphasized as a prerequisite for knowledge sharing (Nonaka,

1991). Trust exists when individuals perceive that their co-workers possess such qualities of trustworthiness and believe that the co-workers would repay them by doing the same thing when they share knowledge with others. Given that sharing tacit knowledge is a form of sharing power with others, it takes trust for individuals to share tacit knowledge with their co-workers, because trust may reduce perceived uncertainty, facilitate risk-taking behaviors, and foster a constructive orientation (Morgan and Hunt, 1994) that consequently enhances their willingness to share tacit knowledge with their co-workers. Accordingly, it was reported that developing organizational commitment, trust, and motivation from workers represents one of the key issues in relation to the management of knowledge workers (Storey and Quintas, 2001), because workers with strong organizational commitment and high levels of trust in co-workers are likely to provide extra discretionary effort and are generally willing to share their tacit knowledge within the organization (Hislop, 2003). As argued by Van den Hooff and Van Weenen (2004), individuals who are more committed to the organization, and has more trust in co-workers, are more likely to share their knowledge. Therefore, the hypothesis linking trust in co-workers and tacit knowledge sharing emerges as follows:

*H<sub>2</sub>: Trust in co-workers is positively related to tacit knowledge sharing.*

*Justice to organizational commitment and trust in co-workers*

Justice is an important issue in the area of ethics, because justice is based heavily upon ethical perceptions that occur within the exchange relationship and emphasizes one's perceptions about the duties that are owed by others (Caldwell et al., 2001; Primeaux et al., 2003).

Justice in organizations is an influential antecedent of employee behavior or attitudes at the workplace, and specifically the commitment of employees toward organizations (Chang, 2002) and the trust in other organizational members (Pearce et al., 1994). Based on the equity theory, researchers have differentiated between procedural and distributive justice while studying organizational justice. Distributive justice reflects the perceived fairness of the outcome

that employees receive, while procedural justice is concerned with the perceptions of fairness about procedures used to determine those outcomes (Brockner and Siegel, 1996). Distributive justice was found to predict organizational commitment (Roberts et al., 1999). Specifically, for example, it was reported that the effects of varying levels of perceived distributive justice on organizational commitment are greater in conditions of low perceived procedural justice than they are in high perceived procedural justice conditions (Roberts et al., 1999). It was reported that pay level, pay rules, and distributing tasks (forms of distributive justice) are positively associated with organizational commitment (Dubinky and Levy, 1989). Meanwhile, organizational justice theory provides with a framework through which to explore and understand employees' feelings of trust or mistrust in others (Saunders and Thornhill, 2003). Specifically, distributive justice was also empirically tested to have an association with trust (Pearce et al., 1994). As perceptions of distributive justice are based on comparisons with others in large, feelings of trust are therefore likely to be influenced by the relative treatment of others and by more generalized opportunities available within an individual's organization (Saunders and Thornhill, 2003). It was reported that higher levels of trust are likely to ensue when distributions of organizational outcomes are considered fair (Pillai et al., 2001). The failure to practice distributive justice may lead to individuals' claim to an outcome compared with what their co-workers receive, leading to feelings of anger and possibly mistrust in their co-workers (Saunders and Thornhill, 2003). Thus, the hypotheses are stated as follows:

*H<sub>3</sub>: Distributive justice is positively related to organizational commitment.*

*H<sub>4</sub>: Distributive justice is positively related to trust in co-workers.*

The theoretical heritage associated with the relationship between procedural justice and organizational commitment stems from the domain of justice-based research (e.g., Lind and Tyler, 1988), which indicates that procedural justice judgments have positive and unambiguous effects on the higher-order attitudes of commitment (Kim and

Mauborgne, 1991). While distributive justice and procedural justice are both related to organizational commitment, organizational commitment is affected more by procedural justice than by distributive justice especially in collectivistic societies (Chang, 2002). Quarles' (1994) path analyses of data from internal audit supervisors and staff level auditors found that satisfaction with promotion opportunities (a form of distributive justice) and satisfaction with the evaluation criteria used (a form of procedural justice) are directly correlated with organizational commitment for the respective groups (Roberts et al., 1999). It has been also confirmed that procedural justice is more highly related to institutional evaluations that require a long-term perspective, like organizational commitment (Lind and Tyler, 1988).

Assessments of trust depend on perceptions not only about fairness of allocations and outcomes but also about the procedures used to arrive at such decisions (Saunders and Thornhill, 2003). For example, individuals who felt that their supervisor had a prejudice in favor of their co-workers are likely to lower their trust in their co-workers due to the unfair treatment. The relationship between procedural justice and trust has been discussed in previous research (Pearce et al., 1994). Evaluations of trust count on perceptions not only about fairness of outcomes, but also about the procedures used to arrive at such decisions (Saunders and Thornhill, 2003). For example, individuals are likely to rate their trust in co-workers positively if they feel that management has conducted appraisals in a fair manner (Pearce et al., 1994). In other words, genuinely fair procedures and processes may relieve the negative reactions such as mistrust that arise from decisions leading to undesirable employee outcomes (Brockner and Siegel, 1996). This is understandable, because when employees perceive procedures to be fair, resentment will be minimal (Roberts et al., 1999), reducing substantially the possibility of being cynical in that organization. Thus, procedural justice is hypothesized to have a positive influence on trust in co-workers. In summary, the hypotheses are described as below.

*H<sub>5</sub>*: Procedural justice is positively related to organizational commitment.

*H<sub>6</sub>*: Procedural justice is positively related to trust in co-workers.

*Cooperativeness to organizational commitment and trust in co-workers*

In addition to justice, cooperative also implies some latent ethics (Sunshine and Tyler, 2003). In line with social identity arguments, people will strongly support their organization when they view the organization as reflecting a positive normative and ethical values, as demonstrated by the manner in which the organization exercises its authority. This idea reflects a general argument that employees cooperate with others in their organization when they identify with the organization (Hogg, 2001; Sunshine and Tyler, 2003).

Employees are the crucial ingredient in the organizational evolution of tacit knowledge sharing as they are the knowledge providers and users (Desouza, 2003). Employees' cooperativeness may be regarded as a personality trait that determines the predisposition of individuals toward commitment to their organization and trust in their co-workers. That is, individuals who behave cooperatively are likely to assist each other and to understand each other's points of view (Laughlin, 1978; Yilmaz and Hunt, 2001), which help strengthen their trust in others. Accordingly, cooperating individuals tend to strongly rely on their organization of labor (Laughlin, 1978; Yilmaz and Hunt, 2001), suggesting the substantial linkage between individuals' cooperativeness and their organizational commitment. While individuals with a low disposition to cooperate place priority on maximizing his or her own welfare regardless of others' welfare, individuals with a higher trait of cooperativeness place priority on associating with co-workers or their organization for mutual benefits, gaining social approval, and working closely with co-workers toward a common goal (Chatman and Barsade, 1995). This results in a strong willingness to commit toward the organization and have trust in co-workers from the perspective of mutual cooperation. Consequently, the hypotheses linking from cooperativeness to organizational commitment and trust in co-workers are described as follows:

*H<sub>7</sub>*: Cooperativeness is positively related to organizational commitment.

*H<sub>8</sub>*: Cooperativeness is positively related to trust in co-workers.

*Social network ties and trust in co-workers*

While focusing on the individual level, previous research supports social network ties with co-workers as a strong variable during the formation of an individual's ethical reasoning (Granitz, 2003; Jones and Kavanaugh, 1996). This logic therefore yields the following justification about the influence of social network ties on trust that stands for an expression of faith on co-workers being ethical (Caldwell and Clapham, 2003; Carnevale, 1995).

Social network theory is important to organizational behaviors because the organizations are embedded in complex networks of social relations (Chae et al., 2005). Specifically, social network theory defines the strength of ties as a combination of the emotional intensity, the amount of time, the intimacy and the reciprocal services characterizing the tie (Chae et al., 2005). Originally derived from social network theory, social network ties are regarded as the process and structure of relationships among others that can facilitate or inhibit access to resources for mutual benefit (Coleman, 1990; Putnam, 1993). A key representative of social network ties may be interpersonal closure – the extent to which the activities of individuals are intertwined with those of their co-workers. High levels of the closure are evident when individuals are acquainted with their co-workers well, and know when they can turn to for support (Chae et al., 2005). The social network ties thus formed after individuals are acquainted with their co-workers facilitate knowledge sharing by providing for mutual support, the exchange of information, common ground for establishing shared expectations (Chae et al., 2005; Coleman, 1990; Putnam, 1993).

Although not empirically tested in previous research, trust mediation between interpersonal relationships (a form of social network ties) and knowledge sharing has been argued to be evident (Castelfranchi, 1998; Castelfranchi and Falcone, 2002), suggesting that social network ties are critical to knowledge sharing via the medication of trust (Levin et al., 2002). For example, in a “strong network ties” organization, members tend to bestow knowledge

given that they form a social network supporting the individual who is not afraid to ask help or to share in performing his or her job (Castelfranchi, 1998; Castelfranchi and Falcone, 2002). It has been noted that the magic ingredient that links strong ties and knowledge sharing is trust (Levin et al., 2002).

The theory of social network has distinguished social network ties between instrumental and expressive ties (Manev and Stevenson, 2001). Individuals' instrumental ties arise in the performance of work and facilitate the transfer of physical, informational, or financial resources to their team members, while expressive ties stand for offering friendship and social support (Manev and Stevenson, 2001). Most social network ties among employees have both instrumental and expressive features. Social identity theory explains why workplace partnership (e.g., instrumental relationship) and friendship (e.g., expressive relationship) are important to individuals and why some people value such social relationships differently from others (Sias et al., 2003). For example, an individual who is well identified in a specific group may want to maintain close contact with the group members working on the same group project (a form of instrumental ties), leading to a strong willingness to trust the co-workers based on their common benefits. Such instrumental ties via social identity often lead to homophily, because an individual is more likely to trust others who have similar missions, attributes, values, and perceptions (Marsden, 1988). Accordingly, friendship is also another factor for individuals to trust in their co-workers (expressive ties). Given that friendships and social support are components of expressive ties (Manev and Stevenson, 2001), individuals are likely to trust those co-workers who offer friendships and social support to them, suggesting that expressive ties are influential on trust in co-workers. In other words, individuals establishing close friendships with co-workers create a potential subgroup that is more likely to yield trust among the individuals and their co-workers through their expressive interactions, indicating that expressive ties may positively affect their trust in co-workers. From the above findings, the hypotheses may be stated as follows.

*H<sub>9</sub>*: Instrumental ties are positively related to trust in co-workers.

*H<sub>10</sub>*: Expressive ties are positively related to trust in co-workers.

## Method

### Subjects

The subjects surveyed in this study are made up of part-time students in the entire business administration (BA) department at a university in Taiwan. These students work as full-time professionals in a variety of service industries during the daytime and go to the university in the evening for advanced study. Using BA students with work experience, rather than those without work experience, helps facilitate improved external validity of the current study. Furthermore, the ethical issue of tacit knowledge sharing in organizations critically related to the area of BA is quite a familiar issue to the sample group. A total of 255 questionnaires were distributed to all students in service industries, and 212 usable questionnaires were finally collected by the researchers (response rate of 83%). Table I lists the characteristics of the sample.

### Measures

The constructs utilized in this study are measured using five-point Likert scales drawn and modified from existing literature. The following steps are employed to choose scale items.

First, the items from the previous studies are translated into Chinese. Second, two university professors familiar with knowledge sharing were asked to examine the Chinese wording of each scale item and comment on its readability and content validity. These comments were used to reword, add, or remove inappropriate items correctly. Third, two pilot tests were conducted prior to the actual survey study to improve item readability and clarity. Subjects for the pilot tests were drawn from students of another university similar to our target university, who were asked to fill out the survey questionnaire and comment on any confusing item in the questionnaire. The sample sizes for the two pilots were 52 and 100, respectively. Based on subjects' suggestions on the first pilot, some items were slightly reworded, resulting in considerable improvement in scale reliability and validity for the data collected during the second pilot. Data collected from the second pilot were analyzed statistically by applying exploratory factor analysis, using the principal

components technique with varimax rotation. Eight factors emerged from the analysis with eigenvalues greater than 1.0, corresponding to the hypothesized factor structure, as shown in the factor matrix in Appendix A. All same-factor loadings were greater than 0.60 except one value slightly smaller than 0.60, meeting the standard acceptance criterion for convergent validity (Hatcher, 1994). Of the 245 possible cross-factor loadings, 232 loadings were less than 0.30 and the remaining 13 had loadings slightly larger than 0.30 (the typical acceptance criterion for discriminant validity). Hence, we decided to retain the scale items for future confirmatory analysis.

Finally, a back-translation technique was employed to convert the Chinese language version of the questionnaire into English and compare the translated English version with the original English items, as recommended by Reynolds et al. (1993). A high degree of correspondence between the two questionnaires assured us that the translation process did not introduce artificial translation biases in our Chinese language questionnaire. Individual scale items which were drawn and modified from previous literature are listed in Appendix B.

TABLE I  
Characteristics of the sample

Characteristic	N = 212	
<i>Gender</i>		
Male	77	36%
Female	135	64%
<i>Age</i>		
20 years or less	3	1%
21–30 years	119	56%
31–40 years	72	34%
41 years or above	18	9%
<i>Marriage</i>		
Single	144	68%
Married	68	32%
<i>Tenure</i>		
5 years or less	148	69%
6–10 years	39	18%
11–15 years	16	8%
16 years or over	11	5%



### Measurement model testing

After data collection, a two-step structural equation modeling (SEM) procedure proposed by Anderson and Gerbing (1988) is then employed for data analysis. The first step of the procedure examines scale validity from the measurement model using confirmatory factor analysis (CFA), while the second step focuses on hypotheses testing using the structural model.

After using MI (modification index) for reference to select indicator variables in measurement model testing (Hatcher, 1994), few indicator variables were removed. Every construct in the measurement model is measured using at least three indicator variables as in Table II. The overall goodness-of-fit indices shown in Table II ( $\chi^2/df$  is smaller than 2.0; RMR is smaller than 0.05, CFI and NNFI are greater than 0.9, while NFI, GFI, and AGFI are slightly lower than 0.9; RMSEA is smaller than the recommended maximum of 0.10) indicate that most fits of the model are satisfactory given that a model's fits need not meet all of the criteria in order to be deemed acceptable (Hatcher, 1994).

Reliability can reflect the internal consistency of the indicators measuring a given factor. As shown in Table II, the reliabilities for all constructs exceed 0.7, satisfying the general requirement of reliability for research instruments. Convergent validity is achieved if different indicators used to measure the same construct obtain strongly-correlated scores. In this study, all factor loadings for indicators measuring the same construct are statistically significant (see Table II), showing that all indicators effectively measure their corresponding construct and support convergent validity (Anderson and Gerbing, 1988). Additionally, the average variance extracted (AVE) for each construct exceeds 0.50, suggesting that the hypothesized items capture more variance in the underlying construct than that attributable to measurement error. Collectively, the above results suggest that instruments used for measuring the constructs of interest in this study are statistically adequate.

Discriminant validity is achieved if the correlations between different constructs, as measured with their respective indicators, are relatively weak. The critical advantage of the chi-square difference test is that it allows for simultaneous pairwise comparisons (based on the Bonferroni method) for the constructs.

By using the Bonferroni method under the overall 0.01 levels, the critical value of the chi-square test is  $\chi^2(1, 0.01/28) = 12.74$ . Since the chi-square difference statistics for every two constructs all exceed 12.74 for the model (see Table III), discriminant validity is successfully achieved.

### Structural model testing

Being an influential variable, gender might have an impact during the formation of knowledge sharing and its antecedents. The topic of gender has been discussed and supported in some specific areas – for example, cross-sex friendships with co-workers (Sias et al., 2003). To avoid making any improper inferences, gender is included as a control variable using the application of dummy variables in this study so as to reduce experimental errors. Following the first step of measurement model testing, the second step analyzing the structural models is now performed. Table IV lists the test results for the structural model.

## Results

Based on test results in Table IV, eight paths out of ten are significant ( $H_1, H_2, H_3, H_4, H_5, H_7, H_9,$  and  $H_{10}$  are supported). However, the linkages from procedural justice and cooperativeness to trust in co-workers are insignificant ( $H_6$  and  $H_8$  are not supported). The failure of the unsupported hypothesis  $H_6$  is interesting and may arise, because the procedural justice tends to predict specific organizational outcomes or organizationally relevant variables (e.g., organizational commitment) rather than interpersonal-related factors (e.g., trust in co-workers) (Farmer et al., 2003). Accordingly, the failure may be also partially explained by the nature of procedural justice that is often used by individuals for a specific evaluation of their organizational system (Lind and Tyler, 1988). Therefore, attempting to associate procedural justice with personal trust in co-workers may violate their belief and faith on social affections in a society. Meanwhile, the failure of the unsupported hypothesis  $H_8$  may exist, because the association between cooperativeness (considered as a trait of personality) and trust in co-workers (interpersonal relationship) could not be found easily by a

TABLE II  
Standardized loadings and reliabilities for measurement model

Construct	Indicators	Standardized loading	AVE	Cronbach's $\alpha$
Tacit knowledge sharing	TK1	0.74 ( $t = 12.22$ )	0.65	0.88
	TK2	0.83 ( $t = 14.47$ )		
	TK3	0.86 ( $t = 15.24$ )		
	TK4	0.80 ( $t = 13.78$ )		
Organizational commitment	OC1	0.76 ( $t = 12.79$ )	0.62	0.89
	OC2	0.79 ( $t = 13.48$ )		
	OC3	0.80 ( $t = 13.76$ )		
	OC4	0.75 ( $t = 12.43$ )		
	OC5	0.86 ( $t = 15.46$ )		
Trust in co-workers	TC1	0.82 ( $t = 14.21$ )	0.64	0.89
	TC2	0.85 ( $t = 15.24$ )		
	TC3	0.86 ( $t = 15.49$ )		
	TC4	0.75 ( $t = 12.59$ )		
	TC5	0.72 ( $t = 11.76$ )		
Distributive justice	DJ1	0.89 ( $t = 15.48$ )	0.64	0.84
	DJ2	0.73 ( $t = 11.80$ )		
	DJ3	0.79 ( $t = 13.11$ )		
Procedural justice	PJ1	0.74 ( $t = 12.21$ )	0.64	0.88
	PJ2	0.84 ( $t = 14.74$ )		
	PJ3	0.81 ( $t = 13.81$ )		
	PJ4	0.81 ( $t = 13.90$ )		
Cooperativeness	CP1	0.76 ( $t = 12.24$ )	0.61	0.83
	CP2	0.78 ( $t = 12.64$ )		
	CP3	0.82 ( $t = 13.59$ )		
Instrumental ties	IT1	0.73 ( $t = 11.78$ )	0.61	0.83
	IT2	0.72 ( $t = 11.57$ )		
	IT4	0.89 ( $t = 15.48$ )		
	ET4	0.86 ( $t = 13.41$ )		
Expressive ties	ET1	0.67 ( $t = 10.09$ )	0.56	0.79
	ET2	0.72 ( $t = 10.86$ )		
	ET4	0.86 ( $t = 13.41$ )		

Goodness-of-fit indices ( $N = 212$ ):

$\chi^2_{377} = 616.32$  ( $p$ -value  $< 0.001$ ).

CFI = 0.94, NFI = 0.86, NNFI = 0.93, GFI = 0.84, AGFI = 0.81, RMR = 0.036, RMSEA = 0.05.

cross-sectional survey given that the relationship between both variables may emerge in a longer time horizon. Another potential reason for the insignificant test result for  $H_8$  may arise due to the intrinsic trait of cooperativeness itself. In tradition, individuals with strong cooperativeness are primarily interested in the business achievement of group objectives in the organization (Yilmaz and Hunt, 2001) rather than social disposition to individual others. However, in order not to overstate the phenomenon, the unexpected results for the unsupported hypotheses warrant further study.

Further analysis of indirect and direct effects is performed as shown in Table V. The decomposition in Table V first indicates that the mediated effect of distributive justice on tacit knowledge sharing through organizational commitment (69%) is substantially stronger than that through trust in co-workers (31%). In addition, the mediated effect of both procedural justice and cooperativeness on tacit knowledge sharing is through organizational commitment (100%) rather than through trust in co-workers (0%). Finally, the influence of both instrumental ties and expressive ties on tacit knowledge

TABLE III  
 $\chi^2$  difference tests

	$\chi^2$ difference						
	TK	OC	TC	DJ	PJ	CP	IT
OC	262.87**						
TC	385.36**	540.53**					
DJ	215.94**	181.60**	182.36**				
PJ	303.37**	233.55**	330.95**	187.77**			
CP	190.80**	218.72**	185.51**	217.58**	234.02**		
IT	179.68**	198.19**	157.63**	208.90**	197.06**	125.35**	
ET	193.92**	193.96**	170.31**	196.80**	193.84**	148.34**	162.51**

\*\* $p < 0.01$  (using the Bonferroni method).  
 Unconstrained model:  $\chi^2 = 616.32$ ;  $df = 377$ .  
 Constrained model:  $df = 378$  (for all models).

Notes: TK = Tacit knowledge sharing, OC = Organizational commitment, TC = Trust in co-workers, DJ = Distributive justice, PJ = Procedural justice, CP = Cooperativeness, IT = Instrumental ties, ET = Expressive ties.

sharing is through the mediation of trust in co-workers (100%).

**Discussion and managerial implications**

This study evaluates a formation of tacit knowledge sharing by considering organizational commitment and trust in co-workers as two critical mediators. According to the test results of this study, tacit knowledge sharing is affected by distributive justice, procedural justice, and cooperativeness indirectly via organizational commitment, while also being affected by distributive justice, instrumental ties, and expressive ties via trust in co-workers. It turns out that low tacit knowledge sharing is likely attributed to a lack of organizational commitment and trust in co-workers, which may be impelled by negative organization-person influence, personal influence, and interpersonal influence. Thus, management may first discover that an organizational ethical policy that addresses organizational justice – both distributively and procedurally – is likely to strengthen organizational commitment and trust in co-workers, resulting in strong tacit knowledge sharing via either organizational commitment or trust in co-workers. Organizational justice may have an important effect on organizational commitment, because it defines the organizational ethical capacity to treat employees

fairly (Roberts et al., 1999). Although many employees view sharing tacit knowledge as ethical (Wang, 2004), their self-interest concerns about distributive justice and procedural justice may still impede such sharing behavior. Due to the self-interest concerns about justice, tacit knowledge sharing decreases when there is low justice within an organization (Wang, 2004).

The empirical findings of this study offer additional support for previous research (e.g., Wang, 2004), indicating that employees may share

TABLE IV  
 Path coefficients and  $t$  value

Hypothesis	Standardized coefficient	$t$ value
H <sub>1</sub>	0.53**	7.06
H <sub>2</sub>	0.20**	2.86
H <sub>3</sub>	0.26**	3.45
H <sub>4</sub>	0.30**	3.89
H <sub>5</sub>	0.46**	6.02
H <sub>6</sub>	0.13	1.79
H <sub>7</sub>	0.15**	2.47
H <sub>8</sub>	0.11	1.26
H <sub>9</sub>	0.29**	3.11
H <sub>10</sub>	0.14*	1.99

\*Significant at the 0.05 significance level.  
 \*\*Significant at the 0.01 significance level.

TABLE V  
Analysis of indirect effects

Path	Indirect effects through				Total effects
	Organizational commitment		Trust in co-workers		
DJ → TK	0.137	(69%)	0.060	(31%)	0.197
PJ → TK	0.243	(100%)	0.000	–	0.243
CP → TK	0.079	(100%)	0.000	–	0.079
IT → TK	0.000	–	0.058	(100%)	0.058
ET → TK	0.000	–	0.028	(100%)	0.028

Notes: TK = Tacit knowledge sharing, DJ = Distributive justice, PJ = Procedural justice, CP = Cooperativeness, IT = Instrumental ties, ET = Expressive ties.

knowledge owing to a satisfactory self-interest about distributive justice and procedural justice that may affect their own right in the organization. Consequently, a somewhat trade-off between the self-interest and tacit knowledge sharing determines what level of detailed knowledge is shared even though tacit knowledge sharing is generally the ethical expectation of employees (Wang, 2004).

As a personality trait, individuals' cooperativeness that significantly affects tacit knowledge sharing via organizational commitment may already exist to a certain degree, high or low, even before the individuals are hired by the organization, but such cooperativeness can be boosted through organizational training. Employees are trained through programs such as entrepreneurship sharing or focus groups to adjust their ethical value in terms of cooperativeness. Accordingly, an organizational culture that encourages the development of social network ties, instrumentally and expressively, may intensify a high level of trust in co-workers, with great tacit knowledge sharing emerging consequently. More implications based on the findings are also discussed below.

An encouraging contingency for employees' reporting on distributive or procedural injustice helps management take proper action to improve injustice, leading to strong tacit knowledge sharing in the long run. The significant influence of distributive justice on both organizational commitment as well as trust in co-workers and the significant influence of procedural justice on only organizational commitment indicate that organizational commitment is substantially a commonly successful mediator that affects tacit knowledge sharing in terms of justice. This finding

suggests that organizational commitment is taken as a checkpoint to examine the influence of organizational justice on tacit knowledge sharing.

Management can administer a standard battery of surveys periodically on employees to detect their commitment toward the organization and their perception about justice. Through this survey, management can also filter out negative impacts coming from either distributive or procedural injustice to organizational commitment and tacit knowledge sharing. Since organizational justice is a sensitive issue, ethical measurements such as an on-line mailbox that may effectively facilitate individuals' intentions to report injustices should be provided. Management should set the ethical tone for the achievement of organizational justice and benefits in an organization by acting as an enabler through engendering the determinations covering justice, since employees' low perceptions about organizational justice may exist, because of a lack of commitment of management toward justice. On the other hand, if management applies rules fairly and consistently to all employees and blame or reward them based on a fair performance evaluation without personal bias, then employees are likely to have a positive response to organizational commitment and trust in their co-workers.

Management should avoid the ignorance of employees' cooperativeness. Once employees lack cooperativeness, they may do unethical things against the organization by not collaborating with others, leading to weak organizational commitment and low tacit knowledge sharing in the end. In fact, individuals who behave cooperatively in the organization should

be honored as a good example for others to learn. In addition to the presence of management support for employee cooperation with their co-workers, employees can arrange to be involved in the conception of the cooperative idea of game rooms so as to facilitate employee exchanges of social relationship and cooperative experience. Employees would be able to learn about any negative and serious consequences through the game rooms if they do not behave cooperatively with their co-workers.

Meanwhile, frequent communication between management and employees further enlarges employees' understanding concerning their responsibilities of being good team members in an organization. Management should express their anticipation and viewpoint regarding employee cooperativeness. Orientation training, realistic job reviews, and formal and informal socialization processes for employees will inspire their willingness to work closely with their co-workers, leading to stronger cooperativeness.

The significant influence of social network ties (comprising instrumental ties and expressive ties) on trust in co-workers reveals that good social relationships among co-workers help them cultivate trust in each other and then yield tacit knowledge sharing. In addition to consulting (which assists those who lack social experience), management may also arrange some organizational activities for employees, such as get-together dinners, sporting contests, and/or sightseeing tours that facilitate the affective exchange among employees, since social network ties may be established owing to proximity and the shared experiences among co-workers (Berman et al., 2002). Gradually, close social network ties may be developed and consequently mutual trust and tacit knowledge sharing among employees are then enhanced. As social network ties among people are likely influenced by ongoing events in their lives, which involve the sharing of emotion (Sias et al., 2003), management should apply mechanisms to diagnose employees' emotional responses in case any conflict exists between employees and their co-workers. The mechanisms formalize a consultation function that is especially critical for junior employees, providing them with opportunities to express their emotional frustration about any social mismatch with their co-workers, and to mediate misunderstandings among employees. Management should be aware that mutual trust is in a potentially

vulnerable situation if the firm is unwilling to invest in creating appropriate contingencies and tools that help foster social network ties among employees.

An additional implication of this study is that no single ethical practice is superior to another in managing organizational commitment and trust in co-workers that enlarges tacit knowledge sharing without simultaneously taking good care of the five different antecedents proposed in this study. Management should create an optimistic organizational ethical climate to inspire the five antecedents in order to reinforce organizational commitment, trust in co-workers, and consequently tacit knowledge sharing.

### Limitations

This study suffers from some limitations relating to data collection and result interpretation. The first limitation is the possibility of a common method bias by using a single questionnaire to measure all constructs, which may inflate the strength of the relationships among these constructs. The second limitation relates to the cross-sectional survey used in this study. The cross-sectional nature of it limits our ability to achieve causal inferences from the data. Longitudinal studies are needed in this area of research. The third limitation is the way this study operationalizes social network ties into two dimensions: instrumental and expressive ties. There are clearly other social mechanisms that warrant an investigation. The fourth limitation is that this study was conducted in a single country setting – Taiwan. As a result, the generalizability of the findings might be limited. Additional research across different countries will be required in order to generalize the findings. The fifth limitation is that the analysis in this model is at the firm level, but an extension of this model should be tried in the area of inter-organizational tacit knowledge sharing. The last limitation is that this study does not involve industrial or occupational differences. It would be interesting to see if there exists separate tacit knowledge sharing climate across different industries or occupations. For example, are bankers more likely to share knowledge than salespeople? How is tacit knowledge sharing affected by an individual's social network ties with others? Future studies can try to improve such shortcomings by including more

APPENDIX A  
Factor matrix from pilot test

Items	F1	F2	F3	F4	F5	F6	F7	F8
TK1	<b>0.631</b>	0.317	0.175	0.150	0.245	0.092	0.057	0.085
TK2	<b>0.686</b>	0.133	0.205	0.124	0.163	0.312	0.260	-0.071
TK3	<b>0.642</b>	0.275	0.051	0.085	0.186	0.293	0.245	-0.018
TK4	<b>0.849</b>	0.132	0.026	0.094	0.175	0.103	0.138	0.063
OC1	0.292	<b>0.653</b>	-0.082	0.218	0.122	0.099	0.030	0.206
OC2	0.297	<b>0.673</b>	0.048	0.124	-0.045	0.121	0.131	0.018
OC3	-0.003	<b>0.774</b>	0.050	0.131	0.171	0.037	0.133	0.117
OC4	0.078	<b>0.760</b>	0.031	0.098	0.244	-0.078	0.031	-0.032
OC5	0.117	<b>0.757</b>	0.057	0.081	0.250	0.205	0.133	-0.047
OC6	0.089	<b>0.694</b>	0.326	0.116	0.175	0.123	0.125	-0.172
OC7	0.099	<b>0.757</b>	0.144	0.094	0.381	0.187	0.050	0.039
TC1	0.147	0.168	<b>0.805</b>	0.100	0.142	0.010	0.121	0.126
TC2	-0.005	0.179	<b>0.571</b>	0.358	0.179	-0.018	-0.018	0.158
TC3	-0.008	0.138	<b>0.790</b>	0.022	0.036	0.092	0.050	0.132
TC4	0.027	-0.091	<b>0.718</b>	0.107	0.089	0.092	0.340	0.036
TC5	0.227	0.010	<b>0.750</b>	0.210	0.115	0.243	-0.115	0.044
DJ1	0.174	0.298	0.069	<b>0.780</b>	0.122	0.016	0.130	-0.057
DJ2	-0.014	0.185	0.233	<b>0.788</b>	0.143	0.095	-0.007	-0.063
DJ3	0.208	0.142	0.216	<b>0.819</b>	0.090	-0.002	0.057	-0.052
PJ1	0.223	0.305	0.156	0.227	<b>0.708</b>	0.077	0.123	0.014
PJ2	0.160	0.417	0.172	0.231	<b>0.708</b>	0.034	0.058	0.038
PJ3	0.083	0.290	0.201	0.006	<b>0.795</b>	0.047	0.136	0.098
PJ4	0.272	0.245	0.062	0.099	<b>0.799</b>	0.099	0.011	0.022
CP1	0.057	0.041	-0.015	0.046	0.155	<b>0.741</b>	0.319	0.219
CP2	0.113	0.129	0.049	0.047	0.238	<b>0.809</b>	0.239	0.025
CP3	0.137	0.100	0.165	0.029	-0.018	<b>0.818</b>	0.143	0.061
CP4	0.221	0.150	0.132	-0.009	-0.098	<b>0.781</b>	0.043	0.071
IT1	0.075	0.163	0.070	0.008	-0.062	0.270	<b>0.801</b>	0.229
IT2	0.342	0.143	0.140	0.067	0.138	0.109	<b>0.659</b>	0.033
IT3	0.074	0.116	-0.003	0.033	0.083	0.157	<b>0.906</b>	0.025
IT4	0.208	0.157	0.257	0.109	0.172	0.340	<b>0.623</b>	0.089
ET1	0.150	-0.016	0.326	0.005	0.101	-0.016	0.301	<b>0.665</b>
ET2	-0.197	-0.001	0.165	0.060	0.090	0.136	-0.001	<b>0.737</b>
ET3	0.196	0.147	0.022	-0.178	-0.139	0.023	-0.025	<b>0.689</b>
ET4	-0.015	-0.048	0.025	-0.028	0.094	0.141	0.121	<b>0.812</b>
Cronbach's $\alpha$	0.85	0.89	0.84	0.84	0.89	0.86	0.86	0.75

Based on principal components technique with varimax rotation.

Legend: TK = Tacit knowledge sharing, OC = Organizational commitment, TC = Trust in co-workers, PJ = Procedural justice, DJ = Distributive justice, CP = Cooperativeness, ET = Expressive ties, IT = Instrumental ties.

APPENDIX B  
Measures of constructs

Construct	Source
Tacit knowledge sharing	
TK1. I share my job experience with my co-workers	Bock and Kim (2002); Daft (2001)
TK2. I share my expertise at the request of my co-workers	
TK3. I share my ideas about jobs with my co-workers	
TK4. I talk about my tips on jobs with my co-workers.	
Organizational commitment	
OC1. I am willing to put in a great deal of effort beyond that normally expected in order to help [name of company] be successful	Wayne et al. (1997); Porter et al. (1974)
OC2. I really care about the fate of [name of company]	
OC3. I am extremely glad that I chose [name of company] for which to work, over others I was considering at the time I joined	
OC4. I talk up [name of company] to my friends as a great organization for which to work	
OC5. I am proud to tell others that I am part of [name of company]	
OC6. I find that my values and the organization's values are very similar.**	
OC7. For me this is the best of all possible organizations for which to work.**	
Trust in co-workers	
I consider my co-workers as people who(m)	Yilmaz and Hunt (2001)
TC1. Can be trusted	
TC2. Can be counted on to do what is right	
TC3. Can be counted on to get the job done right	
TC4. Are always faithful	
TC5. I have great confidence in.	
Distributive justice	
DJ1. I believe that my rewards appropriately reflect my contributions to the organization	Rahim et al. (2001)
DJ2. The productive employees in my organization receive relatively high rewards	
DJ3. The rewards I receive from my organization are approximately in accord with my level of performance.	
Procedural justice	
PJ1. My organization has in place formal channels that allow employees to express their views and opinions before decisions are made	Rahim et al. (2001)
PJ2. Formal procedurals exist in my organization to ensure that officials do not allow personal biases to affect their decisions	
PJ3. There are formal means by which employees in my organization can challenge decisions that they feel are erroneous	
PJ4. My organization has formal procedures to ensure that officials have accurate information on which to base their decisions.	
Cooperativeness	
CP1. I enjoy organizational activities that involve a high level of cooperation with other people	Yilmaz and Hunt (2001)
CP2. I like to be a cooperative member in the organization	
CP3. I found more satisfaction achieving my job goals than achieving my individual goals of my private life.	
CP4. I prefer to work independently rather than in a group (R).**	

## APPENDIX B

Continued

Construct	Source
Instrumental ties	
IT1. In the office, my coworkers and I exchange advice.	Manev and Stevenson (2001);
IT2. My coworkers and I offer assistance with one another during office hours	Van der Vegt et al. (1998)
IT3. My coworkers and I get along well in the office.**	
IT4. My coworkers and I make a good team for coordination in the office.	
Expressive ties	
ET1. I am well acquainted personally with my coworkers	Manev and
ET2. I talk with coworkers about things beyond work	Stevenson (2001)
ET3. I have lunch with my coworkers during break hours.**	
ET4. I consult my coworker for personal matters.	

\*\*These items which did not fit well in the model during CFA were dropped to better improve the model goodness-of-fit.

variables, such as ethical awareness, ethical decision-making, or behaviors so that genuine relationships of tacit knowledge sharing may be better transparently revealed. In addition, future research efforts can also investigate the relative impact of tacit knowledge sharing on job performance as well as any potential interactions between tacit knowledge sharing and explicit knowledge sharing.

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