



# ASSESSING THE EFFECTS OF CULTURAL INTELLIGENCE ON TEAM KNOWLEDGE SHARING FROM A SOCIO-COGNITIVE PERSPECTIVE

MEI-LIANG CHEN AND CHIEH-PENG LIN

*Drawing upon social cognitive theory, this research postulates cultural intelligence as a key driver of knowledge sharing among culturally diverse teams. An empirical testing of the proposed model, by investigating team leaders from high-tech industries, reveals the applicability of social cognitive theory in understanding cultural intelligence, perceived team efficacy, and knowledge sharing. Specifically, the test results herein show that knowledge sharing is directly influenced by metacognitive, cognitive, and motivational cultural intelligence. At the same time, knowledge sharing is indirectly impacted by metacognitive and behavioral cultural intelligence through the mediation of perceived team efficacy. Lastly, this research provides managerial implications and limitations. © 2013 Wiley Periodicals, Inc.*

*Keywords:* social cognitive theory, knowledge sharing, perceived team efficacy, cultural intelligence

## Introduction

**W**ork teams are the basic units in business organizations around the world, and their activities are ubiquitous within organizations (Lin, Wang, Tsai, & Hsu, 2010). With the rapid changes in global environments, teams in business organizations are experiencing greater cross-cultural contact than ever before. Cross-cultural contact is unavoidable and important for culturally diverse teams,

because those teams with capabilities to manage cross-cultural contact (i.e., culturally intelligent teams) will outperform teams that are less intelligent (e.g., Ang & Inkpen, 2008).

Cultural intelligence (CQ) is defined as people's capability to effectively deal with situations characterized by cultural diversity (Earley & Ang, 2003). Specifically, cultural diversity in work teams is very challenging and difficult for team leaders to manage in case of insufficient cultural intelligence (Ang et al., 2007). Having employees who are capable of

Correspondence to: Mei-Liang Chen, No. 245, Sec. 3, Academia Rd., Nangang Dist., Taipei City 115, Taiwan (R.O.C.), Phone: 886-2-2782-1862; Fax: 886-2-2782-1664, E-mail: tiffany@cc.cust.edu.tw; cml491012@yahoo.com.tw.

**Human Resource Management**, September–October 2013, Vol. 52, No. 5. Pp. 675–695

© 2013 Wiley Periodicals, Inc.

Published online in Wiley Online Library (wileyonlinelibrary.com).

DOI:10.1002/hrm.21558

understanding, functioning, and managing their teams under such cultural diversity is a valuable, rare, and inimitable resource that eventually offers teams a competitive advantage, further suggesting the importance of cultural intelligence (Ng, Van Dyne, & Ang, 2009). However, little empirical research has focused on cultural intelligence factors that improve intercultural encounters across culturally diverse teams (Gelfand, Erez, & Aycan, 2007), which this study will discuss.

Prior research indicates that different jobs assigned to employees with different cultural backgrounds are often structured into teams (e.g., multicultural or multinational teams) in which knowledge sharing has become critical

Previous research on how and what specific cultural intelligence improves knowledge sharing in work teams is sparse and unsystematic. This leaves a research gap for this study to explore how different kinds of cultural intelligence influence knowledge sharing across teams.

to teams' success (Ang & Inkpen, 2008; Lin et al., 2010). Knowledge sharing in a team represents people's actions when they disseminate their acquired knowledge to others on the same team (Ryu, Ho, & Han, 2003). Previous studies indicate that teams with cultural diversity increase their innovative knowledge sharing when given enough time to work through miscommunications and conflicts (Mishra & Gupta, 2010; Swann, Kwan, Polzer, & Milton, 2003). Previous research on how and what specific cultural intelligence improves knowledge sharing in work teams is sparse and unsystematic. This leaves a research gap for this study to explore how different kinds of cultural intelligence influence knowledge sharing across teams (e.g., C. M. Anderson, Martin, & Riddle, 2001; Hackman & Morris, 1975; Ilgen, Hollenbeck, Johnson, & Jundt, 2005).

A critical theory that sufficiently clarifies the effect of cultural intelligence on knowledge sharing is Bandura's social cognitive theory (Bandura, 2001). Social cognitive theory is an appropriate theory that examines why people perform knowledge-sharing behavior (e.g., Hsu, Ju, Yen, & Chang, 2007).

Social cognitive theory has proven helpful for understanding factors of cultural environment (e.g., Paul, Hauser, & Bradley, 2007; Saengratwatchara & Pearson, 2004), perceived team efficacy, and knowledge sharing (e.g., Bandura, 1986; Chiu, Hsu, & Wang, 2006). Perceived team efficacy is included because it is an important perception about the extent to which a team can successfully perform its job tasks (Porter, 2005). Scholars have indicated that team efficacy is a key analogue of self-efficacy, which captures the shared belief among members of a team that their team can accomplish certain tasks (Bandura, 1977) such as knowledge sharing or coordination among team members (Chen & Kanfer, 2006). Unfortunately, no previous research related to cultural intelligence has investigated how social cognitive theory functions to simultaneously explain the relationship among cultural intelligence, perceived team efficacy, and knowledge sharing. For that reason, this study is one of the first to empirically assess how team cultural intelligence (reflected in a culturally diverse environment) drives perceived team efficacy (i.e., people's beliefs) and its behavioral outcome (i.e., knowledge sharing) based on social cognitive theory. Indeed, social cognitive theory explains psychological functioning in terms of triadic reciprocal causation in which subjects' beliefs, the way they deal with their environment, and their behavior operate as interacting determinants to their behavior (Wood & Bandura, 1989).

Team outcomes such as collective intention, behavior, or performance are often affected by self-evaluation components of the members of the team, such as perceived team efficacy (e.g., Tyran & Gibson, 2008), team-self-management (Tata & Prasad, 2004), self-guidance training (T. C. Brown, 2003), team self-esteem (e.g., Katz-Navon & Erez, 2005), self-estimation (Olszewska, 1982), and so on. Consistent evidence in previous literature indicates that perceived team efficacy can dominate the way employees act and react in various team settings (Gist, Schwoerer, & Rosen, 1989; Lin, Baruch, & Shih, 2012). Previous literature indicates perceived team efficacy is the most prominent theoretical factor for the studies related to manufacturing

work teams (Little & Madigan, 1997). Particularly, perceived team efficacy is a belief or confidence about the extent to which a team is capable of performing its work-related tasks, thus strengthening knowledge sharing (Kuo & Young, 2008; Siemsen, Roth, Balasubramanian, & Anand, 2009).

This study differs from previous research in two critical ways. First, previous studies linking knowledge sharing to its antecedents do not examine various cultural intelligence dimensions in cross-cultural teaming contexts. To complement the previous studies, this study evaluates four dimensions of cultural intelligence at a team level, regarding their influence on team knowledge sharing. Note that some research has failed to take the multidimensional nature of cultural intelligence into account from a cross-cultural teaming perspective (e.g., Crowne, 2009). Second, this study is a pioneer in empirically validating whether perceived team efficacy fully or partially mediates the relationship between cultural intelligence and knowledge sharing. Such a mediating issue has been rarely examined in previous studies. Collectively, by our evaluating the main effects of cultural intelligence dimensions on knowledge sharing directly and indirectly via the mediation of perceived team efficacy, a clear picture of how cultural intelligence actually motivates knowledge sharing among culturally diverse teams can be substantially developed.

## Research Model and Hypotheses

To build a model of team knowledge sharing, this study draws from key postulates and findings in social cognitive theory (Bandura, 2001). Specifically, this study proposes that knowledge sharing is influenced by four dimensions of cultural intelligence directly and indirectly via the mediation of perceived team efficacy. The four dimensions of cultural intelligence are metacognitive, cognitive, motivational, and behavioral CQs (Earley & Ang, 2003).

Perceived team efficacy is defined as a team's collective beliefs in their job knowledge to collaboratively accomplish a given teamwork. Perceived team efficacy originates

in team members individually, and through processes of social interaction and task experience the members' self-efficacy jointly converges into a group-level factor of perceived team efficacy (Kozlowski & Klein, 2000). Perceived team efficacy is based on an aggregated concept of self-efficacy from the individual level to the team level (Katz-Navon & Erez, 2005; Lin et al., 2012; Tyran & Gibson, 2008). The notion of perceived team efficacy suggests that the positive teaming outcome (e.g., knowledge sharing) can be motivated if team members believe in their collaboration capability to effectively execute their teamwork (e.g., Hsu et al., 2007).

Conventional wisdom has argued that team members with a strong sense of perceived team efficacy are more highly motivated, are likely to be higher achievers, and are more resilient in the face of adversity than those who have weak perceived team efficacy (Gardner & Pierce, 1998; Lin et al., 2012). Perceived team efficacy influences what team members choose to do or share, how much effort they invest in teamwork process (e.g., for knowledge sharing) to reach the team's objectives, and their persistence when initial team efforts fail to obtain good outcomes (Bandura, 1997; Lin et al., 2012). Perceived team efficacy is actually about coaching, teaching, supporting, and encouraging team members to ensure that they have the requisite confidence in their collaboration so as to be successful in performing teamwork (e.g., Lin & Bhattacharjee, 2009), consequently encouraging their knowledge sharing. Thus, the first hypothesis is derived as follows:

*Hypothesis 1: Perceived team efficacy directly motivates knowledge sharing.*

Previous studies have highlighted that people's behavior of knowledge sharing is driven by cultural factors (Jones, Cline, & Ryan, 2006), suggesting a relationship between cultural intelligence and knowledge sharing. Given cultural intelligence has been categorized into four dimensions (Earley & Ang, 2003), the following discusses the positive effect of each dimension on knowledge sharing and perceived team efficacy in detail.

Being the first dimension of cultural intelligence, metacognitive CQ refers to the processes individuals use to acquire and understand cultural knowledge (Ang, Van Dyne, & Koh, 2006). Metacognitive CQ is people's cultural awareness during social interactions with their team members that have different cultural backgrounds (Ang et al., 2006). Given a team's high-quality metacognitive CQ, knowledge sharing improves, because the team members are consciously aware of others' cultural preferences before and during interactions (e.g., Ang et al., 2007; Chiu et al., 2006; Tsai, 2002). People even question inappropriate cultural assumptions and adjust their mental models during and

---

*Training to improve culturally metacognitive skills helps team members build and maintain a sense of perceived team efficacy to deal with challenges faced in the operational environment.*

---

after team interactions of knowledge sharing (Brislin, Worthley, & MacNab, 2006; Triandis, 2006), suggesting a positive effect of metacognitive CQ on knowledge sharing.

Metacognition represents the ability to understand and monitor people's own thoughts, and the implications and assumptions of their group activities (A. L. Brown, Bransford, Ferrara, & Campione, 1983; Day, Gronn, & Salas, 2004; Flavell, 1979). Metacognitive skills have a demonstrated relationship with knowledge acquisition and increased self-efficacy (Day et al., 2004; J. K. Ford, Smith, Weissbein, Gully, & Salas, 1998). Training to improve culturally metacognitive skills helps team members

build and maintain a sense of perceived team efficacy to deal with challenges faced in the operational environment (Day et al., 2004; Kozlowski, 1998). Previous literature indicates that a high level of job efficacy shows up in organizations that have good social interactions (e.g., V. E. Lee, Dedrick, & Smith, 1991), suggesting the potential relationship between metacognitive CQ and perceived team efficacy. Metacognitive CQ reflects people's relevant cultural capabilities, including planning, monitoring, and revising mental models of cultural norms and beliefs for their team and collaborators (Ang et al., 2007), eventually

facilitating their confidence to jointly conduct their teamwork (i.e., perceived team efficacy). Collectively, the hypotheses are derived as follows:

*Hypothesis 2: Metacognitive CQ directly motivates knowledge sharing.*

*Hypothesis 3: Metacognitive CQ indirectly motivates knowledge sharing through the partial mediation of perceived team efficacy.*

Cognitive CQ represents general knowledge and knowledge structures about a particular culture (Ang et al., 2006). It is people's knowledge of specific teaming practices and conventions within a team that contains different cultural settings (Earley & Ang, 2003). In a team with a variety of cultures, cognitive CQ that reflects team members' sufficient knowledge of cultural universals as well as knowledge of cultural differences (Ang et al., 2006) can substantially facilitate their collective self-confidence about their teamwork and knowledge sharing (e.g., D. P. Ford & Chan, 2003). Indeed, those with high cognitive CQ have sufficient knowledge about similarities and differences across cultures (Brislin et al., 2006), and such knowledge (i.e., understanding the similarities and differences across cultures) is key for effective knowledge sharing (Michailova & Hutchings, 2006), suggesting a direct and positive relationship between cognitive CQ and knowledge sharing.

Cognitive CQ consists of the shared beliefs that shape a group's purpose and identity (Choo, 2000), thus driving their shared beliefs in their ability to perform a specific teamwork (i.e., perceived team efficacy). Team members with high cognitive CQ can understand key differences among cultures and overcome prejudices to collaborate with others (Ang & Van Dyne, 2008), thus increasing perceived team efficacy. Conversely, those with low cognitive CQ are unlikely to integrate their insights and reflections into coherent knowledge structures about culture (Ng et al., 2009), thus impeding the formation of perceived team efficacy in culturally diverse settings. Conducting teamwork with cultural knowledge (i.e., cognitive CQ) is a social

activity, where interpretation and the construction of beliefs (or team confidence) take place through shared conversations (Choo, 2000). In this process, team members should be able to actively participate in disseminating and discussing the information they receive, drawing attention or adding comments to the input when they wish (i.e., knowledge sharing) (Choo, 2000). Collectively, these phenomena suggest a positive effect of cognitive CQ on perceived team efficacy and knowledge sharing. The hypotheses are thus stated as follows:

*Hypothesis 4: Cognitive CQ directly motivates knowledge sharing.*

*Hypothesis 5: Cognitive CQ indirectly motivates knowledge sharing through the partial mediation of perceived team efficacy.*

Motivational CQ is defined as the capability to direct attention and energy toward learning about and functioning in circumstances characterized by cultural differences (Ang et al., 2007). It is people's interest and drive in adapting to cultural differences (Earley & Ang, 2003), pushing a team to accomplish its goal (e.g., knowledge sharing) (Ang et al., 2007; Kanfer & Heggstad, 1997). Ang, Van Dyne, Koh, and Ng (2004) conceptualized motivational CQ as a specific form of cultural confidence and intrinsic motivation (Deci & Ryan, 1985) in cross-cultural situations (Ang et al., 2006). Cultural confidence and intrinsic motivation are important to motivational CQ, because successful intercultural interactions require a basic sense of self-confidence and interest in novel cultural settings (Ang et al., 2006). When team members enjoy successful intercultural interactions with other members (due in part to high motivational CQ), they are likely to support sharing knowledge in the team (Finestone & Snyman, 2005), suggesting a close relationship between motivational CQ and knowledge sharing.

Given that perceived team efficacy is people's beliefs in their ability to collaboratively conduct teamwork, their beliefs are likely strengthened if they are confident in adapting to cultural differences in their culturally

diverse team (i.e., motivational CQ) while practicing teamwork simultaneously (Earley, 1994). Previous literature indicates that people's high motivational CQ directs their confidence in their cross-cultural work effectiveness (Ang et al., 2007; Bandura, 2002), suggesting a positive linkage between motivational CQ and perceived team efficacy.

People's motivational CQ triggers attention and effort, consequently stimulating and channeling their cultural knowledge and strategies into guided action in novel cultural experiences (Templer, Tay, & Chandrasekar, 2006). Employees high in motivational CQ are more open and persist in adapting to new situations, including work situations characterized by cultural diversity (Ang et al., 2004; Earley & Ang, 2003; Templer et al., 2006). Therefore, they are more likely to be psychologically confident in adjusting to the teamwork demands expected in the cultural settings (Templer et al., 2006), suggesting a positive relationship between motivational CQ and perceived team efficacy. In sum, this study hypothesizes a positive influence of motivational CQ on knowledge sharing and perceived team efficacy as follows.

*Hypothesis 6: Motivational CQ directly motivates knowledge sharing.*

*Hypothesis 7: Motivational CQ indirectly motivates knowledge sharing through the partial mediation of perceived team efficacy.*

Behavioral CQ focuses on what individuals do (i.e., their overt actions) instead of what they think or feel (i.e., thoughts and emotions) (Ang et al., 2006). Behavioral CQ refers to individuals' flexibility in performing appropriate verbal and nonverbal actions when interacting with their team members who have different cultural backgrounds (Earley & Ang, 2003). Behavioral CQ helps improve three conditions: (1) the specific range of behaviors that are enacted; (2) the display rules for when specific nonverbal expressions are required, preferred, permitted, or prohibited; and (3) the interpretations of particular nonverbal behaviors (Ang et al., 2006; Lustig & Koester, 1999). In other words,

behavioral CQ entails interpersonal skills and the capability in cross-cultural encounters to engage in such quality social reciprocal activities (Ang et al., 2006) as knowledge sharing, suggesting a direct and positive relationship between behavioral CQ and knowledge sharing.

Team members' flexibility in verbal and nonverbal behaviors (e.g., for better communications) helps establish their self-confidence in performing their teamwork in a culturally diverse team, leading to a positive relationship between behavioral CQ and perceived team efficacy. Indeed, a previous empirical study (Rubin, Martin, Bruning, & Powers, 1993) suggests that people's efficacy may decrease through past experience and situation difficulty on interpersonal communication in a culturally diverse team. As previous literature suggests that people's efficacy increases due to the behavioral skills learned by them to manage threatening organizational activities (Bandura, 1977, 1982; Earley & Gardner, 2005), behavioral CQ that entails the interpersonal skills (i.e., behavioral skills) in cross-cultural encounters (Ang et al., 2006) is thus likely to facilitate quality knowledge sharing through the increased perceived team efficacy. Hence, a high level of behavioral CQ helps for cultivating perceived team efficacy. In summary of these rationales, this study proposes the following hypotheses:

*Hypothesis 8: Behavioral CQ directly motivates knowledge sharing.*

*Hypothesis 9: Behavioral CQ indirectly motivates knowledge sharing through the partial mediation of perceived team efficacy.*

## Method

### *Subjects and Procedures*

The subjects investigated in this study are made up of team leaders across large and multinational high-tech firms in Taiwan. The team leaders were recruited, because they possess a clear overview about teaming statuses such as perceived team efficacy,

knowledge sharing, and cross-cultural contacts (Hanges, Lord, & Dickson, 2000; P. Lee, Gillespie, Mann, & Wearing, 2010). Thirty large and multinational high-tech firms were initially chosen (that is, small and medium-sized firms were all excluded) in a well-known science park in north Taiwan, and 12 out of the 30 firms agreed to offer assistance for our investigation. The 12 firms are appropriate representative samples herein, because they team up their employees from different countries for a wide variety of their teaming functions across production, marketing, financing, human resource management, and research and development. The selection of the sample teams with different teaming functions in this study is considered good for the generalizability of its empirical findings. The team size in this study ranges from 5 to 20. Whereas the level of ethnic diversity differs across different teams, all the participants did confirm that their people of different nationalities were teamed up to accomplish their team missions. Collectively, the sample teams contained team members from a total of 13 foreign nations.

Two sets of questionnaires for team leaders were distributed at two different time points with one month apart. Specifically, the questionnaire that contains the scale items of our antecedents and mediator is used for the survey at Time 1 (perceived team efficacy and CQs), while the questionnaire that contains the scale items of our outcome (i.e., knowledge sharing) is distributed at Time 2 (that is, one month later). Survey subjects (i.e., team leaders) were invited to fill out the two sets of questionnaires, linked by a four-digit identifier (the last four digits of their home or cell phone number).

Of the 540 questionnaires distributed to team leaders, 298 usable matched pairs were returned across both time periods, for a response rate of 55.19 percent, containing 121 females (40.6 percent) and 177 males (59.40 percent). A total of 139 respondents range between 25 and 40 years old (46.64 percent), while the other 160 respondents range between 41 and 55 years old (53.36 percent). The mean age is 40.44. Moreover,

an independent *t*-test in this research for detecting nonresponse bias recommended by Baruch and Holtom (2008) did not show any significant difference between early and late respondents. Appendix A lists the correlation matrix for our constructs based on the actual survey data.

## Measures

The survey was designed by drawing questionnaire items from prevalidated scales in previous studies (Ang et al., 2007; Lin, 2007; Mosley, Boyar, Carson, & Pearson, 2008) and modified to fit the culturally diverse teaming contexts. Three major steps are employed to refine the scale items for our survey. First, the scale items from the existing literature were translated into Chinese by a focus group of four students and one professor, who are all familiar with the research areas of cultural differences and organizational behavior. Second, key points of back-translation suggested by Reynolds, Diamantopoulos, and Schlegelmilch (1993) were applied to examine an English-version questionnaire as well as a Chinese one by an outside scholar who was not an author of this study. A high degree of correspondence between the two questionnaires (evaluated by the outside scholar) assures that the translation process did not introduce substantial translation biases in the Chinese version of our questionnaire. Third, the items were examined via two pilot tests with exploratory factor analysis (EFA), and improper ones were reviewed, refined, or dropped before the actual survey. Pilot-test respondents were excluded in the subsequent survey. This process of instrument refinement led to considerable improvement in content validity and scale reliability. Appendix B lists all the measurement items of this study and their sources.

Most of our scale items were drawn or modified from previous literature to fit our research contexts of culturally diverse teams. For example, while an item for measuring metacognitive CQ in previous literature was "I am conscious of the cultural knowledge I use when interacting with people with

different cultural backgrounds," this study slightly modified this item to "We are conscious of the cultural knowledge we use when interacting with our co-workers with different cultural backgrounds." As another example, while an item for measuring cognitive CQ was "I know the legal and economic systems of other cultures," this study slightly modified it to "We know the legal and economic systems of other cultures which our co-workers are from." Besides, individuals' perception about their team efficacy was measured as the proxy of the perceived team efficacy in this study. Collectively, we have conducted a thorough procedure for developing and designing scale items appropriately (e.g., items from previous literature, a modification by our focus group, assessment by an outside scholar, exploratory factor analysis, etc.) in this study.

For the two questionnaire surveys herein, this study applied three critical measures to reduce or avoid the potential threat of common method bias. First, collecting our data from surveying the same subjects twice at two different time points effectively reduces the threat of common method bias. Note that such a survey measure is much more powerful than any post-hoc statistical methods used for detecting or eliminating common method bias. Second, this study surveyed respondents without obtaining their names to reduce their suspicion or hesitation for factually filling out our survey questionnaires. Respondents were assured of complete anonymity in the cover letter, confirming that neither their personal names nor the names of their organizations would be disclosed. Third, Harman's single-factor test was performed (Podsakoff & Organ, 1986), revealing that no single factor that accounts for a majority of the variances is found. More specifically, an exploratory factor analysis of all items for the six constructs in Table I revealed six factors explaining 19.93 percent, 17.16 percent, 16.56 percent, 16.34 percent, 15.24 percent, and 14.77 percent of the total variance, respectively. These values reveal that none of the factors solely accounts for the majority of the covariance in the independent and dependent variables, indicating that the variances are properly

TABLE I Standardized Loadings and Reliabilities

Construct	Indicators	Standardized Loading	AVE	Cronbach's $\alpha$
Knowledge sharing	KS1	0.88 ( $t = 18.49$ )	0.62	0.87
	KS2	0.83 ( $t = 16.87$ )		
	KS3	0.85 ( $t = 17.57$ )		
	KS4	0.68 ( $t = 12.85$ )		
Perceived team efficacy	TE1	0.73 ( $t = 14.11$ )	0.61	0.89
	TE2	0.76 ( $t = 15.08$ )		
	TE3	0.73 ( $t = 14.22$ )		
	TE4	0.85 ( $t = 17.59$ )		
	TE5	0.86 ( $t = 18.02$ )		
Metacognitive CQ	ME1	0.78 ( $t = 15.21$ )	0.60	0.86
	ME2	0.78 ( $t = 15.42$ )		
	ME3	0.78 ( $t = 15.38$ )		
	ME4	0.79 ( $t = 15.58$ )		
Cognitive CQ	CO1	0.70 ( $t = 12.78$ )	0.51	0.80
	CO2	0.75 ( $t = 13.97$ )		
	CO3	0.70 ( $t = 12.81$ )		
	CO4	0.74 ( $t = 13.59$ )		
Motivational CQ	MO1	0.76 ( $t = 14.84$ )	0.59	0.80
	MO2	0.82 ( $t = 16.65$ )		
	MO3	0.72 ( $t = 13.71$ )		
	MO4	0.90 ( $t = 19.26$ )		
Behavioral CQ	BE1	0.87 ( $t = 18.41$ )	0.67	0.89
	BE2	0.90 ( $t = 19.33$ )		
	BE3	0.81 ( $t = 16.42$ )		
	BE4	0.69 ( $t = 13.20$ )		

Notes: Goodness-of-fit indices ( $N = 298$ ):  $\chi^2_{260} = 490.66$  ( $p$ -value  $< 0.001$ ); NNFI = 0.94; NFI = 0.90; CFI = 0.95; GFI = 0.89; RMR = 0.03; RMSEA = 0.05.

distributed among the proposed factors. That is, common method bias is unlikely a threat in our data sample. Based on these three measures, common method bias is not likely to be a threat in our data sample.

## Results

### Confirmatory Factor Analysis

The final survey data with a sample size of 298 usable team responses were analyzed first by confirmatory factor analysis (CFA) and second by regression analysis. While CFA was used to analyze the collected data for

assessing scale reliability and validity, the regression analysis was used for testing our hypotheses. Test results from CFA and regression analysis are stated, respectively, next.

CFA was done on all items corresponding to our six research constructs. The goodness of fit of the hypothesized CFA model was assessed by applying a variety of fit metrics as shown in Table I. Specifically, the values of CFI, NFI, and NNFI were all larger than or equal to 0.9, whereas the value of GFI was slightly lower than 0.90. The normalized chi-square (chi-square/degrees of freedom) of the CFA model was smaller than the recommended value of 3.0, the RMR was smaller



TABLE II Chi-Square Difference Tests for Examining Discriminant Validity

Construct Pair	$\chi^2_{260} = 490.66$ (Unconstrained Model)	
	$\chi^2_{261}$ (Constrained Model)	$\chi^2$ Difference
(F1, F2)	942.98***	452.32
(F1, F3)	802.48***	311.82
(F1, F4)	754.94***	264.28
(F1, F5)	1,021.75***	531.09
(F1, F6)	1,021.50***	530.84
(F2, F3)	812.03***	321.37
(F2, F4)	801.08***	310.42
(F2, F5)	1,052.54***	561.88
(F2, F6)	966.74***	476.08
(F3, F4)	712.47***	221.81
(F3, F5)	939.71***	449.05
(F3, F6)	772.57***	281.91
(F4, F5)	751.64***	260.98
(F4, F6)	799.32***	308.66
(F5, F6)	1,098.20***	607.54

Notes: \*\*\*Significant at the 0.001 overall significance level by using the Bonferroni method.

Legend: F1 = knowledge sharing; F2 = perceived team efficacy; F3 = metacognitive CQ; F4 = cognitive CQ; F5 = motivational CQ; F6 = behavioral CQ.

than 0.05, and the RMSEA was smaller than 0.08. Overall, these figures suggest that the hypothesized CFA model of this study appropriately fits the empirical data (Bentler & Bonett, 1980).

Convergent validity was assessed through three criteria suggested by Fornell and Larcker (1981). First, all factor loadings in Table I were significant at  $p < 0.01$ , which assures convergent validity of our research constructs (J. C. Anderson & Gerbing, 1998). Second, the values of Cronbach's alpha of all the constructs were larger than 0.70 (see Table I), satisfying the requirement of reliability for research instruments. Third, the average variance extracted (AVE) of all the constructs exceeded 0.50, indicating that the overall measurement items adequately capture sufficient variance in the underlying construct than that attributable to measurement error (Fornell & Larcker, 1981). All in all, the empirical data of this study met all three criteria required to assure our convergent validity.

This study assesses discriminant validity with chi-square difference tests (Hatcher, 1994; Lin, 2006, 2011). By our controlling for the experiment-wise error rate at the overall significance level of 0.001, the Bonferroni method suggests that the critical value of the chi-square difference should be 12.21. Because chi-square difference statistics for all pairs of constructs in Table II exceeded this critical value of 12.21, discriminant validity for this study's data sample is supported. For that reason, the empirical results of this study show that the instruments used for measuring the constructs of interest in this study are statistically acceptable.

In addition to that CFA, this study conducts a further analysis of competing models recommended by previous literature (Avolio, Sivasubramaniam, Murray, Jung, & Garger, 2003; Lin, 2010) in order to ensure that the proposed model of this study is tentatively accepted. Specifically, the fit indices of the validation models in Table III reveal that the proposed model of this study based on the six

**TABLE III** Fit Indices of This Study's Validation Models

Models	$\chi^2$	df	$\chi^2/df$	NNFI	NFI	CFI	GFI	RMR	RMSEA
Model 1	2,350.94	275	8.55	0.49	0.50	0.53	0.55	0.09	0.16
Model 2	1,994.58	274	7.28	0.57	0.58	0.61	0.58	0.09	0.15
Model 3	1,569.18	272	5.77	0.68	0.67	0.71	0.64	0.08	0.13
Model 4	1,369.51	269	5.09	0.72	0.71	0.75	0.66	0.08	0.12
Model 5	1,178.87	265	4.45	0.77	0.75	0.79	0.70	0.07	0.11
Model 6	490.66	260	1.89	0.94	0.90	0.95	0.89	0.03	0.05

Note 1: Model 1 = One factor (all six constructs in this study are grouped as one factor for CFA).

Note 2: Model 2 = Two factors (except knowledge sharing, the other five factors in this study are grouped as one factor).

Note 3: Model 3 = Three factors (metacognitive CQ, cognitive CQ, motivational CQ, and behavioral CQ are grouped as one factor).

Note 4: Model 4 = Four factors (cognitive CQ, motivational CQ, and behavioral CQ are grouped as one factor).

Note 5: Model 5 = Five factors (motivational CQ and behavioral CQ are grouped as one factor).

Note 6: Model 6 = Full six factors.

**TABLE IV** Regression Analysis for Testing Mediation Effects

	Model A	Model B	Model C	Model D
	Knowledge Sharing	Perceived Team Efficacy	Knowledge Sharing	Knowledge Sharing
Independent variables:				
Metacognitive CQ	0.38**	0.28**		0.30**
Cognitive CQ	0.14**	0.05		0.13*
Motivational CQ	0.14**	0.03		0.14**
Behavioral CQ	0.09	0.24**		0.02
Mediator:				
Perceived team efficacy			0.59**	0.30**
<i>Adj R</i> <sup>2</sup>	0.32	0.31	0.22	0.36

\* $p < 0.05$ .

\*\* $p < 0.01$ .

Note 1: We have conducted the analysis of SEM (structural equation modeling) to test our research model, and its test results are consistent with all the significant effects in the above regression analysis.

Note 2: In the above tests, this study has included various control variables such as team size, the leaders' gender, the leaders' age, the ratio of expatriate members, the ratio of members' difference in gender, the ratio of members' difference in age, and the ratio of members' difference in higher education.

factors is the best among competing models. In other words, Table III is provided to choose the most appropriate model among various competing models of this study, which is different from Table II, which is used for testing discriminant validity (Lin, 2010).

In this study, we use multiple regression models for testing our mediation effects (see Table IV). We follow the work of Baron and Kenny (1986) that offers four steps for testing mediation models. It is important to note that this study has included team size (i.e., the number of team members), the team leaders' gender (males vs. females),

the team leaders' age (years), the ratio of expatriate members, the ratio of members' difference in gender, the ratio of members' difference in age, and the ratio of members' difference in higher education as control variables to avoid inappropriate inferences in case of unpredictable effects caused by these variables. Note that these variables are all controlled by being linked to both our outcome (i.e., knowledge sharing) and mediator (i.e., perceived team efficacy). Collectively, the four steps proposed by Baron and Kenny (1986) are explained in detail as follows:

- In the first step, we test the direct effects of our four independent variables on the outcome (i.e., knowledge sharing) in Model A. The test results in Model A show that three out of the four independent variables are significantly related to our outcome (i.e., knowledge sharing), suggesting that only behavioral CQ is unlikely to have a direct effect on knowledge sharing.
- In the second step, we test the effects of our four independent variables on the mediator (i.e., perceived team efficacy) in Model B. The test results in Model B show that cognitive and motivational CQs are insignificantly related to perceived team efficacy, suggesting that these variables are not mediated by perceived team efficacy.
- In the third step, we only include our mediator (i.e., perceived team efficacy) and outcome (i.e., knowledge sharing) in Model C. The test results in Model C show a significant relationship between perceived team efficacy and knowledge sharing.
- In the fourth step, we test the effects of our four independent variables and one mediator on the outcome (i.e., knowledge sharing) in Model D. The test results show that only behavioral CQ is not significantly related to knowledge sharing, suggesting that behavioral CQ is likely to influence knowledge sharing only through perceived team efficacy.

Following the procedure by Baron and Kenny (1986), we further conduct a Sobel test to confirm the mediation effects of this study. It is important to note that a Sobel test is a post-hoc probing for further confirming the significance of mediation effects only after the mediation models are verified by the four-step procedure of Baron and Kenny (1986) (Barrera et al., 2004; Costarelli & Colloca, 2007). It would be somewhat arbitrary to examine the results of the Sobel test without the verification of the mediation models by the four-step procedure of Baron and Kenny (1986). If a variable fails to show any mediation effect in the testing procedure

of Baron and Kenny (1986), it is not necessary to conduct a Sobel test for such mediation effect.

The Sobel test is a specialized *t*-test that offers a method to determine whether the reduction in the effect of the independent variable, after including the mediator in the research model, is significant (Kaplan, Wiley, & Maertz, 2011; Preacher & Hayes, 2004). More specifically, we will have to test different regression models (see Appendix C) when evaluating a mediation effect with the Sobel test (Preacher, Rucker, & Hayes, 2007). The test results of regression models and the Sobel test statistic (Baron & Kenny, 1986) are presented in Appendix C, which supports the potential mediation of perceived team efficacy.

In summary, the test results of this study show that six out of our nine hypotheses are supported. First, perceived team efficacy has a direct and positive effect on knowledge sharing (thus, H1 is supported). Second, while metacognitive, cognitive, and motivational CQs have direct and positive effects on knowledge sharing, behavioral CQ has no direct influence on knowledge sharing (thus, H2–H4 are supported, but H5 is not supported). Moreover, metacognitive and behavioral CQs have indirect and positive effects on knowledge sharing via the mediation of perceived team efficacy, whereas cognitive and motivational CQs have no indirect effect on knowledge sharing at all (thus, H6 and H9 are supported, but H7 and H8 are not supported).

The unsupported results for three out of our nine hypotheses suggest that not all elements of cultural intelligence have equivalent effects on both knowledge sharing and perceived team efficacy. Specifically, behavioral CQ having no direct effect on knowledge sharing may imply that the behavioral CQ, which reflects visible capability (e.g., verbal actions) rather than mental capability (i.e., cognitive and motivational CQs), only generates an indirect effect on knowledge

---

*While metacognitive, cognitive, and motivational CQs have direct and positive effects on knowledge sharing, behavioral CQ has no direct influence on knowledge sharing.*

---

sharing (often taking much mental efforts). By contrast, the cognitive and motivational CQs that reflect strong mental capability show only direct effects on knowledge sharing rather than indirect ones. Nevertheless, the unexpected results for the insignificant model paths warrant further study so that the real causes behind the unsupported relationships between research constructs are not misinterpreted.

Finally, we have further conducted a post-hoc analysis for testing multicollinearity, and the test results show that the Variance Inflation Factors (VIFs) for perceived team efficacy, metacognitive, cognitive, motivational, and behavioral CQs are 1.47, 1.80, 1.45, 1.30, and 1.60, respectively. Since these values are much lower than 10, the multicollinearity is not significant at all.

## Discussion

This research provides an illustrative and practical instance of how social cognitive theory can be further applied to understand knowledge sharing in cross-cultural teaming contexts. Most previous teaming models based on social cognitive theory only focus on performance within the same cultural settings (e.g., Gully, Incalcaterra, Joshi, & Beaubien, 2002). This study presents that factors of teams' own beliefs (i.e., perceived team efficacy) and their adaptability to environment (i.e., cultural intelligence) should be used to learn about team knowledge sharing in more depth. The test results of this study provide preliminary evidence of knowledge sharing across culturally diverse teams, which is a nascent yet emerging field that bears tremendous potential for future research.

Given the rising prevalence of work teams in multinational enterprises, team leaders should know what factors drive team

knowledge sharing, if their organizations are to benefit from successfully managing work teams in which members are from different countries with different cultural origins.

Of the four CQs in this study, metacognitive CQ seems the most influential factor that facilitates knowledge sharing due to its significantly direct and indirect effects on knowledge sharing. This phenomenon suggests that if cultural differences in a team show serious and negative impacts on knowledge sharing, then the team leader should prioritize their limited resources (e.g., organizing incentives linked to metacognitive CQ or embedding such a CQ as a part of teaming performance matrices) to improve metacognitive CQ in a timely manner. This is particularly important for those teams with new members under different cultural backgrounds inevitably having dramatic changes in their teaming activities.

In addition to metacognitive CQ, the other three CQs have either direct or indirect effects on knowledge sharing, suggesting that they are complementary to each other in facilitating knowledge sharing. Team leaders should encourage their members to take actions toward experiencing different cultural values and manners and establishing their self-confidence even under a culture that is unfamiliar to them. For example, team leaders may instruct employees to appreciate documentary films that introduce different national cultures and systems (for improving cognitive CQ), hold parties in which employees can have fun interacting with foreign co-workers (for improving motivational CQ), and guide employees' international etiquette (for improving behavioral CQ). These actions taken regularly together can substantially arouse interpersonal respect in order to increase their knowledge sharing directly or indirectly through perceived team efficacy. These findings and suggestions are particularly critical when team leaders require an involved collaborative posture within small windows of time (e.g., an emergent project for a new team with many different foreign members).

Last but not least, team leaders should make good use of perceived team efficacy as a key checkpoint that displays the joint

---

*Given the rising prevalence of work teams in multinational enterprises, team leaders should know what factors drive team knowledge sharing, if their organizations are to benefit from successfully managing work teams in which members are from different countries with different cultural origins.*

---

effect of metacognitive and behavioral CQs. For example, if strong perceived team efficacy (i.e., the joint effect of metacognitive and behavioral CQs is high) and weak knowledge sharing are found, then it is very likely that the direct effects of cognitive and motivational CQs are questionable. In that case, training programs specifically for increasing cognitive and motivational CQs should be provided to improve their direct and positive effects on knowledge sharing.

### Limitations

The results of this study should be interpreted in light of their limitations. The first limitation relates to the industries investigated by this study. As the respondents of this study are team leaders from multinational high-tech firms, the findings may not be precisely generalizable across work teams in traditional industries. The restricted nature of our sample suggests that any generalization of our findings across different industries should be made with caution.

The second limitation relates to a problem of the direction of causation: is there a possibility that knowledge sharing causes perceived team efficacy or CQ? While most previous studies have indicated that knowledge sharing is influenced by individuals' self-efficacy (Cheung & Lee, 2007; Endres, Endres, Chowdhury, & Alam, 2007; Hsu et al., 2007; Hu, 2010; Wu, Tsai, & Wang, 2011), it might be still possible in teaming contexts that the relationship between knowledge sharing and perceived team efficacy might be circular, with greater perceived team efficacy increasing knowledge sharing and higher knowledge sharing enhancing perceived team efficacy. Such circular relationships may be further examined by future scholars.

Third, given our focus on culturally diverse teams, this study has limited its attention of predictors of knowledge sharing to cultural intelligence. Some other critical factors that may drive team knowledge sharing, such as team commitment, team identification, and so on, may be examined in future

research. It is also possible that, for example, these factors may play important mediating roles for improving knowledge sharing in addition to perceived team efficacy tested in this study.

The fourth limitation relates to the team leaders as the sample subjects that measured perceived team efficacy in this study. It might be possible that some team leaders were unable to capture the actual level of perceived team efficacy. Nevertheless, previous literature indicates that team leaders are more likely to set the tone and quality of perceived team efficacy (Liu, Kwan, & Fisher, 2009), because perceived team efficacy is more influenced by team leaders or high-status employees (Gibson & Earley, 2007; Liu et al., 2009). Collectively, future research can try to include team leaders as well as high-status employees as sample subjects so that perceived team efficacy can be more accurately obtained.

In summary, we believe that those issues related to sample subjects and some unexplored factors can be interesting subjects for future researchers. Specifically, cultural demographic profiles of the teams should also be thoroughly examined. Future scholars are encouraged to include more factors and survey more industries so as to compare their explanatory ability to those tested in this study. While being examined as an exogenous factor in this study, cultural intelligence may be assessed in future research as a moderator that influences the relationship between perceived team efficacy and knowledge sharing. Future research can try integrating moderation and medication in a single-model setting of cultural intelligence (e.g., Edwards & Lambert, 2007).

### Acknowledgment

This work was financially supported by the National Science Council in Taiwan.

---

*Collectively, future research can try to include team leaders as well as high-status employees as sample subjects so that perceived team efficacy can be more accurately obtained.*

---

**MEI-LIANG CHEN** is a lecturer in the China University of Science and Technology in Taiwan. She graduated and received her master's degree from Kainan University in Taiwan. Her expertise is in marketing management as well as human resource management. Her work has been published in journals such as the *African Journal of Business Management*, the *Journal of Global Business Management*, the *Journal of International Management Studies*, and the *Journal of Human Resource and Adult Learning*.

**CHIEH-PENG LIN** is a professor in the Institute of Business & Management at the National Chiao Tung University in Taiwan. His research interests focus on the social science related to organizational behavior and information technology. His work has been published in a variety of journals, including the *Asian Journal of Social Psychology*, *Computers in Human Behavior*, *CyberPsychology & Behavior*, *Group & Organization Management*, *Human Factors*, the *Information Systems Journal*, the *International Journal of Electronic Commerce*, the *International Journal of Service Industry Management*, the *Journal of Business Ethics*, *Technological Forecasting and Social Change*.

## References

- Anderson, C. M., Martin, M. M., & Riddle, B. L. (2001). Small group relational satisfaction scale: Development, reliability, and validity. *Communication Studies*, 52, 220–233.
- Anderson, J. C., & Gerbing, D. W. (1998). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103, 411–423.
- Ang, S., & Inkpen, A. C. (2008). Cultural intelligence and offshore outsourcing success: A framework of firm-level intercultural capability. *Decision Sciences*, 39, 337–358.
- Ang, S., & Van Dyne, L. (2008). Handbook on cultural intelligence: Theory, measurement and applications. Armonk, NY: M. E. Sharpe.
- Ang, S., Van Dyne, L., & Koh, C. (2006). Personality correlates of the four-factor model of cultural intelligence. *Group & Organization Management*, 31, 100–123.
- Ang, S., Van Dyne, L., Koh, C., & Ng, K. Y. (2004, August). The measurement of cultural intelligence. Presented at the 2004 Academy of Management Meetings Symposium on Cultural Intelligence in the 21st Century, New Orleans, LA.
- Ang, S., Van Dyne, L., Koh, C., Ng, K., Templer, K. J., Tay, C., & Chandrasekar, N. A. (2007). Cultural intelligence: Its measurement and effects on cultural judgment and decision making, cultural adaptation, and task performance. *Management and Organization Review*, 3, 335–371.
- Avolio, B. J., Sivasubramaniam, N., Murray, W. D., Jung, D., & Garger, J. W. (2003). Assessing shared leadership: Development and preliminary validation of a team multifactor leadership questionnaire. In C. L. Pearce & J. A. Conger (Eds.), *Shared leadership* (pp. 143–172). Thousand Oaks, CA: Sage.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of organizational change. *Psychological Review*, 84, 191–215.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122–147.
- Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs, NJ: Prentice Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.
- Bandura, A. (2001). Social cognitive theory of mass communication. *Media Psychology*, 3, 265–299.
- Bandura, A. (2002). Social cognitive theory in cultural context. *Applied Psychology*, 51, 269–290.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1182.
- Barrera, M., D'agostino, N. M., Gibson, J., Gilbert, T., Weksberg, R., & Malkin, D. (2004). Predictors and mediators of psychological adjustment in mothers of children newly diagnosed with cancer. *Psycho-Oncology*, 13, 630–641.
- Baruch, Y., & Holtom, B. (2008). Survey response rate levels and trends in organizational research. *Human Relations*, 61, 1139–1160.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness-of-fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588–606.

- Brislin, R., Worthley, R., & MacNab, B. (2006). Cultural intelligence: Understanding behaviors that serve people's goals. *Group & Organization Management, 31*, 40–55.
- Brown, A. L., Bransford, J. D., Ferrara, R. A., & Campione, J. C. (1983). Learning, remembering, and understanding. In J. H. Flavell & E. M. Markman (Eds.), *Handbook of child psychology: Cognitive development* (Vol. 3, pp. 77–166). New York, NY: Wiley.
- Brown, T. C. (2003). The effect of verbal self-guidance training on collective efficacy and team performance. *Personnel Psychology, 56*, 935–964.
- Chen, G., & Kanfer, R. (2006). Toward a system theory of motivated behavior in work teams. In B. M. Staw (Ed.), *Research in organizational behavior* (Vol. 27, pp. 223–267). Greenwich, CT: JAI Press.
- Cheung, C. M. K., & Lee, M. K. O. (2007). What drives members to continue sharing knowledge in a virtual professional community? The role of knowledge self-efficacy and satisfaction. In Z. Zhang & J. Siekmann (Eds.), *Knowledge science, engineering and management: Second international conference KSEM 2007 proceedings* (pp. 472–484). Berlin, Germany: Springer-Verlag.
- Chiu, C. M., Hsu, M. H., & Wang, E. T. G. (2006). Understanding knowledge sharing in virtual communities: An integration of social capital and social cognitive theories. *Decision Support Systems, 42*, 1872–1888.
- Choo, C. W. (2000). Working with knowledge: How information professionals help organizations manage what they know. *Library Management, 21*, 395–403.
- Costarelli, S., & Colloca, P. (2007). The moderation of ambivalence on attitude-intention relations as mediated by attitude importance. *European Journal of Social Psychology, 37*, 923–933.
- Crowne, K. A. (2009). The relationships among social intelligence, emotional intelligence and cultural intelligence. *Organization Management Journal, 6*, 148–163.
- Day, D. V., Gronn, P., & Salas, E. (2004). Leadership capacity in teams. *Leadership Quarterly, 15*, 857–880.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.
- Earley, P. C. (1994). Self or group? Cultural effects of training on self-efficacy and performance. *Administrative Science Quarterly, 39*, 89–117.
- Earley, P. C., & Ang, S. (2003). *Cultural intelligence: Individual interactions across cultures*. Stanford, CA: Stanford University Press.
- Earley, P. C., & Gardner, H. K. (2005). Internal dynamics and cultural intelligence in multinational teams. In D. L. Shapiro, M. A. V. Glinow, & C. Joseph (Eds.), *Managing multinational teams: Global perspectives* (Vol. 18, pp. 3–31). Amsterdam, the Netherlands: Elsevier.
- Edwards, J. R., & Lambert, L. S. (2007). Methods for integrating moderation and mediation: A general analytical framework using moderated path analysis. *Psychological Methods, 12*(1), 1–22.
- Endres, M. L., Endres, S. P., Chowdhury, S. K., & Alam, I. (2007). Tacit knowledge sharing, self-efficacy theory, and application to the open source community. *Journal of Knowledge Management, 11*(3), 92–103.
- Finestone, N., & Snyman, R. (2005). Corporate South Africa: Making multicultural knowledge sharing work. *Journal of Knowledge Management, 9*(3), 128–141.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive–developmental inquiry. *American Psychologist, 34*, 906–911.
- Ford, D. P., & Chan, Y. E. (2003). Knowledge sharing in a multi-cultural setting: A case study. *Knowledge Management Research & Practice, 1*(1), 11–27.
- Ford, J. K., Smith, E. M., Weissbein, D. A., Gully, S. M., & Salas, E. (1998). Relationships of goal-orientation, metacognitive activity, and practice strategies with learning outcomes and transfer. *Journal of Applied Psychology, 83*, 218–233.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*, 39–50.
- Gardner, D. G., & Pierce, J. L. (1998). Self-esteem and self-efficacy within the organizational context: An empirical examination. *Group & Organization Management, 23*, 48–70.
- Gelfand, M. J., Erez, M. E., & Aycan, Z. (2007). Cross-cultural organizational behavior. *Annual Review of Psychology, 58*, 479–514.
- Gibson, C. B., & Earley, P. C. (2007). Collective cognition in action: Accumulation, interaction, examination, and accommodation in the development and operation of group efficacy beliefs in the workplace. *Academy of Management Review, 32*, 438–458.
- Gist, M. E., Schwoerer, C., & Rosen, B. (1989). Effects of alternative training methods on self-efficacy and performance in computer software training. *Journal of Applied Psychology, 74*, 884–891.
- Gully, S. M., Incalcaterra, K. A., Joshi, A., & Beaubien, J. M. (2002). A meta-analysis of team-efficacy,

- potency, and performance: Interdependence and level of analysis as moderators of observed relationships. *Journal of Applied Psychology*, 87, 819–832.
- Hackman, J. R., & Morris, C. G. (1975). Group tasks, group interaction process, and group performance effectiveness: A review and proposed integration. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 8). New York, NY: Academic Press.
- Hanges, P. J., Lord, R. G., & Dickson, M. W. (2000). An information-processing perspective on leadership and culture: A case for connectionist architecture. *Applied Psychology*, 49, 133–161.
- Hatcher, L. (1994). *A step-by-step approach to using the SAS system for factor analysis and structural equation modeling*. Cary, NC: SAS Institute Inc.
- Hsu, M. H., Ju, T. L., Yen, C. H., & Chang, C. M. (2007). Knowledge sharing behavior in virtual communities: The relationship between trust, self-efficacy, and outcome expectations. *International Journal of Human-Computer Studies*, 65, 153–169.
- Hu, W. W. (2010). Self-efficacy and individual knowledge sharing. *Proceedings of the 2010 International Conference of Information Management, Innovation Management and Industrial Engineering (ICIII)*, pp. 401–404.
- Ilgen, D. R., Hollenbeck, J. R., Johnson, M., & Jundt, D. (2005). Teams in organizations: From input-process-output models to IMO models. *Annual Review of Psychology*, 56, 517–543.
- Jones, M. C., Cline, M., & Ryan, S. (2006). Exploring knowledge sharing in ERP implementation: An organizational culture framework. *Decision Support Systems*, 41, 411–434.
- Kanfer, R., & Heggstad, E. D. (1997). Motivational traits and skills: A person-centered approach to work motivation. *Research in Organizational Behavior*, 19(1), 1–56.
- Kaplan, D. M., Wiley, J. W., & Maertz, C. P., Jr. (2011). The role of calculative attachment in the relationship between diversity climate and retention. *Human Resource Management*, 50, 271–287.
- Katz-Navon, T. Y., & Erez, M. S. (2005). When collective and self-efficacy affect team performance: The role of task interdependence. *Small Group Research*, 36, 437–465.
- Kozlowski, S. W. J. (1998). Training and developing adaptive teams: Theory, principles, and research. In J. A. Cannon-Bowers & E. Salas (Eds.), *Making decisions under stress: Implications for individual and team training* (pp. 115–153). Washington, DC: APA Press.
- Kozlowski, S. W. J., & Klein, K. J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organization: Foundations, extensions, and new directions* (SIOP Frontiers Series, pp. 3–90). San Francisco, CA: Jossey-Bass.
- Kuo, F. Y., & Young, M. L. (2008). Predicting knowledge sharing practices through intention: A test of competing models. *Computers in Human Behavior*, 24, 2967–2722.
- Lee, P., Gillespie, N., Mann, L., & Wearing, A. (2010). Leadership and trust: Their effect on knowledge sharing and team performance. *Management Learning*, 41, 473–491.
- Lee, V. E., Dedrick, R. F., & Smith, J. B. (1991). The effect of the social organization of schools on teachers' efficacy and satisfaction. *Sociology of Education*, 64, 190–208.
- Lin, C. P. (2006). To help or not to help: Understanding the helping intentions from a mediating perspective of social network ties. *Journal of Business Ethics*, 63, 175–182.
- Lin, C. P. (2007). To share or not to share: Modeling knowledge sharing using exchange ideology as a moderator. *Personnel Review*, 36, 457–475.
- Lin, C. P. (2010). Learning task effectiveness and social interdependence through the mediating mechanisms of sharing and helping: A survey of online knowledge workers. *Group & Organization Management*, 35, 299–328.
- Lin, C. P. (2011). Modeling job effectiveness and its antecedents from a social capital perspective: A survey of virtual teams within business organizations. *Computers in Human Behavior*, 27, 915–923.
- Lin, C. P., & Baruch, Y. (forthcoming). All for one, one for all: Coopetition and virtual team performance. *Technological Forecasting and Social Change* 79, 1155–1168.
- Lin, C. P., Baruch, Y., & Shih, W. C. (2012). Corporate social responsibility and team performance: The mediating role of team efficacy and team self-esteem. *Journal of Business Ethics*, 108, 167–180.
- Lin, C. P., & Bhattacharjee, A. (2009). Understanding online social support and its antecedents: A socio-cognitive model. *Social Science Journal*, 46, 724–737.
- Lin, C. P., Wang, Y. J., Tsai, Y. H., & Hsu, Y. F. (2010). Perceived job effectiveness in coopetition: A survey of virtual teams within business organization. *Computers in Human Behavior*, 26, 1598–1606.
- Little, B. L., & Madigan, R. M. (1997). The relationship between collective efficacy and performance in manufacturing work teams. *Small Group Research*, 28, 517–534.
- Liu, D., Kwan, H. K., & Fisher, G. C. (2009, November). Does an entrepreneur's personality matter? A



- multilevel, multiphase investigation of core-self evaluations in the growth of top management team potency and new venture performance. Presented at the 2009 meeting of the Southern Management Association (SMA), Asheville, NC.
- Lustig, M. W., & Koester, J. (1999). *Intercultural competence: Interpersonal communication across cultures* (3rd ed.). New York, NY: Addison-Wesley Longman.
- Michailova, S., & Hutchings, K. (2006). National cultural influences on knowledge sharing: A comparison of China and Russia. *Journal of Management Studies*, 43, 383–405.
- Mishra, S., & Gupta, R. (2010). Impact of national cultural diversity on knowledge sharing in Indian multicultural teams: An emic study. *International Journal of Indian Culture and Business Management*, 3, 384–406.
- Mosley, D. C., Jr., Boyar, S. L., Carson, C. M., & Pearson, A. W. (2008). A production self-efficacy scale: An exploratory study. *Journal of Managerial Issues*, 20, 272–285.
- Ng, K. Y., Van Dyne, L., & Ang, S. (2009). From experience to experiential learning: Cultural intelligence as a learning capability for global leader development. *Academy of Management Learning & Education*, 8, 511–526.
- Olszewska, G. (1982). The relation of a self-image, self-estimation and a tendency to dominate or submit to the effectiveness of the performance of team players. *International Journal of Sport Psychology*, 13(2), 107–113.
- Paul, R., Hauser, R. D., & Bradley, J. H. (2007). The relationship between individual differences, culture, anxiety, computer self-efficacy and user performance. *International Journal of Information Systems and Change Management*, 2, 125–138.
- Podsakoff, P. M., & Organ, D. W. (1986). Self-reports in organizational research: Problems and prospects. *Journal of Management*, 12, 531–544.
- Porter, C. O. L. H. (2005). Goal orientation: Effects on backing up behavior, performance, efficacy, and commitment in teams. *Journal of Applied Psychology*, 90, 811–818.
- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods*, 36, 717–731.
- Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Assessing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, 42, 185–227.
- Reynolds, N., Diamantopoulos, A., & Schlegelmilch, B. B. (1993). Pretesting in questionnaire design: A review of the literature and suggestions for further research. *Journal of the Market Research Society*, 35, 171–182.
- Rubin, R. B., Martin, M. M., Bruning, S. S., & Powers, D. E. (1993). Test of a self-efficacy model of interpersonal communication competence. *Communication Quarterly*, 41, 210–220.
- Ryu, S., Ho, S. H., & Han, I. (2003). Knowledge sharing behavior of physicians in hospitals. *Expert Systems with Applications*, 25, 113–122.
- Saengratwatchara, P., & Pearson, J. (2004, August). The impact of culture on training methods and computer self-efficacy. *Proceedings of the Tenth Americas Conference on Information Systems*, New York, New York, pp. 447–451.
- Siemsen, E., Roth, A. V., Balasubramanian, S., & Anand, G. (2009). The influence of psychological safety and confidence in knowledge on employee knowledge sharing. *Manufacturing & Service Operations Management*, 11, 429–447.
- Swann, W. B., Jr., Kwan, V. S. Y., Polzer, J. T., & Milton, L. P. (2003). Fostering group identification and creativity in diverse groups: The role of individuation and self-verification. *Personality and Social Psychology Bulletin*, 29, 1396–1406.
- Tata, J., & Prasad, S. (2004). Team self-management, organizational structure, and judgments of team effectiveness. *Journal of Management Issues*, 16, 248–265.
- Templer, K. J., Tay, C., & Chandrasekar, N. A. (2006). Motivational cultural intelligence, realistic job previews, and realistic living conditions preview, and cross-cultural adjustment. *Group & Organization Management*, 31, 154–173.
- Triandis, H. C. (2006). Cultural intelligence in organizations. *Group & Organization Management*, 31, 20–26.
- Tsai, W. (2002). Social structure of “cooperation” within a multiunit organization: Coordination, competition, and intraorganizational knowledge sharing. *Organization Science*, 13, 179–190.
- Tyran, K. L., & Gibson, C. B. (2008). Is what you see, what you get? The relationship among surface- and deep-level heterogeneity characteristics, group efficacy, and team reputation. *Group & Organization Management*, 33, 46–76.
- Wood, R., & Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review*, 14, 361–384.
- Wu, C. S., Tsai, L. F., & Wang, P. W. (2011). Correlation between technological creativity, self efficacy and knowledge sharing among athletes. *International Journal of Management and Marketing Research*, 4(2), 77–84.

		Correlation Matrix													
	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Leader's gender	0.59	0.49	-												
2. Leader's age	28.56	3.80	-0.01	-											
3. Ratio of members' difference in gender	2.84	1.43	0.08	0.01	-										
4. Ratio of members' difference in age	1.82	1.01	-0.07	0.14	0.08	-									
5. Ratio of members of higher education	3.47	1.44	-0.10	-0.12	0.29	0.10	-								
6. Ratio of expatriate members	1.41	0.77	-0.04	0.06	0.00	0.24	0.07	-							
7. Team size	10.61	2.88	0.05	-0.03	-0.08	0.08	0.05	0.00	-						
8. Knowledge sharing	3.87	0.73	-0.01	0.00	-0.04	0.08	-0.05	0.03	-0.06	-					
9. Perceived team efficacy	4.09	0.58	-0.02	0.05	-0.01	-0.01	0.00	0.06	-0.13	0.47**	-				
10. Metacognitive CQ	3.93	0.65	-0.12	0.03	0.03	0.06	0.01	0.00	-0.05	0.51**	0.51**	-			
11. Cognitive CQ	3.31	0.77	0.04	-0.02	0.06	0.01	-0.07	-0.08	-0.07	0.41**	0.32*	0.47**	-		
12. Motivational CQ	3.38	0.85	-0.04	0.02	-0.01	0.07	-0.10	0.01	-0.17	0.37*	0.26	0.32*	0.44**	-	
13. Behavioral CQ	4.02	0.66	-0.02	0.01	0.04	0.06	-0.01	0.03	-0.07	0.37*	0.48**	0.55**	0.33*	0.32*	-

\*  $p < .05$ .  
 \*\*  $p < .01$ .

**APPENDIX B Measurement Items****Knowledge sharing** (Source: Lin, 2007)

In our team, . . .

KS1. We share our job experience with each other.

KS2. We share our expertise at the request of other members.

KS3. We share our ideas about jobs with one another.

KS4. We share work reports and official documents with one another.

**Perceived team efficacy** (Source: Mosley et al., 2008)

In our team, . . .

TE1. We are confident in supporting each other to meet the quality demands of the teamwork.

TE2. We are confident in helping each other to correct teamwork mistakes.

TE3. We are confident in reminding each other of following all of the safety rules.

TE4. We are confident in working closely to maintain teamwork effectiveness.

TE5. We are confident in assisting each other to keep up with the operational pace of the team.

**Metacognitive CQ** (Source: Ang et al., 2007)

In our team, . . .

ME1. We are conscious of the cultural knowledge we use when interacting with our co-workers with different cultural backgrounds.

ME2. We adjust our cultural knowledge as we interact with co-workers from a culture that is unfamiliar to us.

ME3. We are conscious of the cultural knowledge we apply to cross-cultural interactions.

ME4. We check the accuracy of our cultural knowledge as we interact with people from different cultures.

**Cognitive CQ** (Source: Ang et al., 2007)

In our team, . . .

CO1. We know the legal and economic systems of other cultures which our co-workers are from.

CO2. We know the rules (e.g., vocabulary, grammar) of other languages which our co-workers use.

CO3. We know the social systems of other cultures which our co-workers are from.

CO4. We know the arts and values of other cultures which our co-workers are from.

**Motivational CQ** (Source: Ang et al., 2007)

In our team, . . .

MO1. We are sure we can deal with the stresses of adjusting to a culture that is new to us.

MO2. We enjoy learning about cultures that are unfamiliar to us.

MO3. We are confident that we can get accustomed to the working conditions influenced by a different culture.

MO4. We are confident that we can socialize with people in a culture that is unfamiliar to us.

*(Continued)*

**Behavioral CQ** (Source: Ang et al., 2007)

In our team, . . .

BE1. We change our verbal behavior (e.g., accent, tone) when a cross-cultural interaction requires it.

BE2. We use different tones or manners of speaking to suit different cross-cultural situations.

BE3. We vary the rate of our speaking when a cross-cultural situation requires it.

BE4. We change our nonverbal behavior when a cross-cultural situation requires it.

**Control variables** (Source: Lin & Baruch, 2012)

CV1. The percentage of male members in the team:

0%–20%  21%–40%  41%–60%  61%–80%  81%–100%

CV2. The percentage of members with substantial age differences (e.g., too young members) in the team:

0%–20%  21%–40%  41%–60%  61%–80%  81%–100%

CV3. The percentage of members with higher education degree (college or graduate degrees) in the team:

0%–20%  21%–40%  41%–60%  61%–80%  81%–100%

CV4. The percentage of team members working in a different location or different office buildings (e.g., expatriates):

0%–20%  21%–40%  41%–60%  61%–80%  81%–100%

---

**APPENDIX C The Post-Hoc Test Results of Sobel Tests****The mediation of perceived team efficacy between metacognitive CQ and knowledge sharing**

	<b>Independent Variables</b>	<b>Dependent Variables</b>	<b>Coefficients</b>
Model a	Metacognitive CQ	Team efficacy	0.453**
Model b	Metacognitive CQ	Knowledge sharing	0.571**
Model c	Team efficacy	Knowledge sharing	0.586**
Model d	Team efficacy	Knowledge sharing	0.354**
	Metacognitive CQ		0.411**

Sobel test statistic: 6.773.

**The mediation of perceived team efficacy between behavioral CQ and knowledge sharing**

	<b>Independent Variables</b>	<b>Dependent Variables</b>	<b>Coefficients</b>
Model e	Behavioral CQ	Team efficacy	0.419**
Model f	Behavioral CQ	Knowledge sharing	0.407**
Model g	Team efficacy	Knowledge sharing	0.586**
Model h	Team efficacy	Knowledge sharing	0.471**
	Behavioral CQ		0.209**

Sobel test statistic: 6.529.