

# Transformational Leadership and Team Performance: The Mediating Roles of Cognitive Trust and Collective Efficacy

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Huey-Wen Chou<sup>1</sup>, Yu-Hsun Lin<sup>2</sup>, Hsiu-Hua Chang<sup>1</sup>  
and Wen-Wei Chuang<sup>1</sup>

## Abstract

This study explores the relationships among transformational leadership style, cognitive trust, and collective efficacy as well as the impact of these variables on distal team performance. Data collected from 39 teams find that team cognitive trust as two process variables involves a transformational leadership process in which cognitive trust in the team leader and cognitive trust among team members mediate the impact of this leadership style on collective efficacy. Unlike previous studies, our results show that leveraging cognitive trust in the team leader is necessary but not sufficient for better proximal collective efficacy, which in turn facilitates distal team performance. Although cognitive trust among team members was more closely related to proximal collective efficacy than cognitive trust in the team leader was, the factors that foster the development of cognitive trust among team members remain scantily explored in the transformational leadership literature and deserve more attention in future research.

## Keywords

transformational leadership style, cognitive trust, collective efficacy, team performance

## Introduction

With the growing need to acquire a sustainable competitive advantage, many organizations have moved toward flattened hierarchies and self-managed teams (Antoni & Hertel, 2009). Therefore, the use of teams has become an essential feature in many organizations (Cohen & Bailey, 1997; Tasa, Taggar, & Seijts, 2007). Given the reports from management and scholars emphasizing the importance of teams for organizational success (Cohen & Bailey, 1997), understanding the antecedents of team performance is critical for academic and practitioner communities.

The team leader plays a central role in determining group performance. For example, the research commissioned by Project Management Institute (PMI) reported that the project leadership style is a key success factor to project team performance (Turner & Müller, 2005). Several taxonomies for classifying leaders by style have been proposed in the literature. Among these, the transformational leadership style has been one of the most cited theories of leadership (Judge & Bono, 2000). Transformational leadership is defined as the one that creates valuable and positive changes in its followers. Dvir, Eden, Avolio, and Shamir (2002) showed that transformational leadership is highly effective in terms of subordinates' development and performance. Although research on transformational leadership has consistently noted that there is an underlying process through which

transformational leaders exhibit their influences on their followers' development and ultimately facilitate team performance (e.g., Dvir et al., 2002; Walumbwa, Wang, Lawler, & Shi, 2004; Wang & Howell, 2012), surprisingly relatively little research has explored this topic especially in project team settings.

Among the process variables associated with the transformational leadership process, trust has been acknowledged as one important factor that can mediate the effect of the transformational leadership on group outcomes (Braun, Peus, Weisweiler, & Frey, 2013; Jung & Avolio, 2000; Zhu, Newman, Miao, & Hooke, 2013). Another group process variable that may emerge in the transformational leadership process is collective efficacy (Zhang, Tsui, & Wang, 2011). Prior studies have found the effects of transformational leadership on collective efficacy (e.g., Arnold, Barling, & Kelloway, 2001; Walumbwa et al., 2004; Zhang et al., 2011), trust (e.g., Arnold et al., 2001; Jung & Avolio, 2000), and team performance (e.g., Jung & Avolio, 2000; Walumbwa et al., 2004). However, the relationship between these factors

<sup>1</sup>National Central University, Jhongli, Taiwan

<sup>2</sup>Ming Chi University of Technology, New Taipei City, Taiwan

## Corresponding Author:

Huey-Wen Chou, National Central University, 300 Jhongda road, Jhongli 32054, Taiwan.

Email: hwc928@gmail.com

has not been fully scrutinized, especially in a project team context. The present study therefore proposes a research framework with the aim of investigating the tangled relationships between transformational leadership, collective efficacy, team cognitive trust, and team performance in project team settings.

## Team Performance in a Transformational Leadership Process

Team performance refers to the extent to which a team meets established objectives for quality, cost, and time (Hoegl & Gemuenden, 2001). The conceptualization of team performance as a multidimensional construct is acknowledged in the literature (Burke, Sims, Lazzara, & Salas, 2007; Jung & Avolio, 2000). Jung and Avolio (2000) identified three dimensions of team performance: quantity, quality, and satisfaction. They found that transformational leadership affects team performance through value congruence and trust. Burke et al. (2007) suggested that team performance is the distal outcome variable of trust in leadership. Under transformational leadership, team's cognitive trust and collective efficacy may evolve during the team development and serve as process variables that explain the distal team performance.

Cognitive trust refers to individual beliefs about peer reliability and dependability (McAllister, 1995). Kanawattanachai and Yoo (2007) indicated that cognitive trust grounded in the beliefs regarding others' ability and reliability to accomplish a task (Kanawattanachai & Yoo, 2007). Dirks and Skarlicki (2004) found that a team leader with effective transformational leadership style was beneficial to gain subordinates' trust. In teamwork settings, team members collaborate and rely on other members' competency and professionalism to complete the assigned task. Members of a team without building cognitive trust among team members are not willing to put more efforts to coordinate their actions for performing the given task. Akgün, Keskin, Byrne, and Imamoglu (2007) demonstrated a strong beneficial effect of interpersonal trust on software project teams' collective efficacy.

Collective efficacy is defined as "a group's shared belief in its conjoint capabilities to organize and execute courses of action required to produce given levels of attainment" (Bandura, 1997, p. 477). Jung and Sosik (2002) found that collective efficacy was related to the performance of a work group in the transformational leadership process. Walumbwa et al. (2004) demonstrated that collective efficacy emerges from the team development and mediates the impact of transformational leadership on work outcomes.

Collective efficacy involves individuals' perceptions regarding the group's performance capability (Kozub & McDonnell, 2000). When individuals hold strong collective efficacy, they are likely to devote more effort to achieving goals (Bandura, 1986). Studies have indicated that collective

efficacy has a positive impact on team performance (Gully, Beaubien, Incalcaterra, & Joshi, 2002) and that it relates to group performance in different contexts, including education (Parker, 1994), sports (Kozub & McDonnell, 2000), and organizations (Gibson, 2003). Based on the results of previous studies, we propose the following hypothesis.

*Hypothesis 1:* A team's collective efficacy has a positive impact on team performance.

Studying the trust within a group has attracted many researchers' attention (Dirks & Skarlicki, 2004; Simons & Peterson, 2000). McKnight, Cummings, and Cherany (1998) described trust as the belief and the willingness to depend on another party. When team members perceive a high level of trust in their interactions, they tend to devote more effort to cooperative behaviors (Kramer, Brewer, & Hanna, 1996). Trust is therefore an important variable in explaining why team members are willing to complete their jobs jointly in a team project setting.

Trust in a team may include different dimensions, such as trust in the team leader and trust among members. Previous research has mainly focused on trust in the team leader; nevertheless, the impact of trust among team members on distal outcomes has not gained much attention. Dirks and Skarlicki (2004) suggested that focusing solely on a team's trust in a supervisor may ignore other important referents. Therefore, exploring the impact of team cognitive trust, such as cognitive trust among team members, is a must for researchers to obtain a more complete understanding of the team-based working relationships. This study conceptualizes team cognitive trust as having two dimensions: cognitive trust in the team leader and cognitive trust among team members.

Trust in a leader was frequently found to mediate the leadership–outcome relationship in studies of leadership processes (e.g., Dirks & Ferrin, 2002; Dirks & Skarlicki, 2004; Hoyt & Blascovich, 2003; Jung & Avolio, 2000); nevertheless, different referents of trust may have different consequences in the leadership process (Dirks & Ferrin, 2002). Dirks and Skarlicki (2004) suggested that a team leader not only takes action to build the team's trust in the team leader but also fosters the development of trust among team members necessary to perform a given task effectively.

Research on project management found that trust is likely to be an antecedent of collective efficacy. Akgün et al. (2007) found that strong interpersonal trust enhanced software project teams' collective efficacy. They suggested that mutual trust among team members will facilitate team members to collaborate more effectively. If a team builds stronger cognitive trust among team members, members of the team are willing to put more efforts to work together and become more confident in the group's ability to successfully complete a task. Thus, higher cognitive trust among team members would help enhance team's collective efficacy.

Cognitive trust in the team leader, however, is members' confidence in the team leader. Its influence on collective efficacy is proposed to be weaker than cognitive trust among team members is. This study therefore hypothesizes that the effect of cognitive trust among team members on collective efficacy is stronger than the effect of cognitive trust in the team leader on collective efficacy.

*Hypothesis 2:* Cognitive trust among team members has a stronger positive effect on collective efficacy than cognitive trust in the team leader does.

Leadership is "the process of influencing individuals or groups so as to achieve group goals" (Hoyt & Blascovich, 2003, p. 679). Transformational leadership has been found to be positively associated with trust in the team leader, collective efficacy (e.g., Hoyt & Blascovich, 2003), and team performance (e.g., Hoyt & Blascovich, 2003; Jung & Avolio, 2000). According to Bass (1985), transformational leaders exert influence on subordinates by broadening and elevating followers' goals and providing them with the confidence to go beyond specified, minimally acceptable expectations. The literature (e.g., Avolio & Bass, 1995; Podsakoff, MacKenzie, Moorman, & Fetter, 1990) has confirmed that trust in the leader is a consequence of transformational leadership because transformational leaders empower and encourage followers to make decisions, thus gaining their followers' trust. Jung and Avolio (2000) confirmed that trust in the team leader helps to explain the impact of transformational leadership on performance. The mediating role of trust in the team leader on the relationship between transformational leadership and performance was also confirmed in Hoyt and Blascovich's (2003) study of virtual and physical working environments.

What is the relationship between a transformational leadership and cognitive trust among team members? Few studies have addressed this question. Shamir, House, and Arthur (1993) suggested that transformational leaders build followers' personal and social identification and enhance members' feelings of cohesiveness. Sosik, Avolio, and Kahai (1997) found that transformational leadership positively affects the level of creative output generated by team members. This implies that transformational leaders can facilitate interdependent work among group members and encourage members to work together, help team members establish a sense of cognitive trust, and foster positive feelings among themselves. In other words, transformational leadership may directly influence trust among team members. In this regard, transformational leadership may exert a different effect on trust in the team leader as it does on trust among team members. Therefore, this study proposes the following hypothesis to investigate whether a transformational leadership style's impact on cognitive trust in the team leader is different from its impact on cognitive trust among team members.

*Hypothesis 3:* A transformational leadership style has a different effect on cognitive trust in the team leader as its effect on cognitive trust among team members.

Collective efficacy is team members' shared belief regarding the team's ability to accomplish a given task, which may result from the building of cognitive trust within a team. Researchers have indicated that a transformational leader through displaying idealized influence, intellectual stimulation, inspirational motivation, and individualized consideration could facilitate team members' trust in the leader (e.g., Jung & Avolio, 2000) and mutual trust among team members (e.g., Zhu et al., 2013). In the team process, transformational leadership is beneficial to the establishment of team cognitive trust (Zhu et al., 2013). When a team leader displays a transformational leader style, team members will perceive a high level of team cognitive trust and therefore will be more likely to perceive to others' ability and reliability to perform a task (Kanawattanachai & Yoo, 2007; McAllister, 1995). Accordingly, team cognitive trust is likely to be related to a team's collective efficacy in the transformational leadership process.

As discussed earlier, transformational leadership would help to foster team cognitive trust, which in turn would positively leverage collective efficacy. Team cognitive trust therefore may play a mediating role in the relation between transformational leadership and collective efficacy. Nevertheless, relatively little empirical research appeared to have investigated the mediating role of team cognitive trust in the transformational leadership-collective efficacy relationship. Given that team cognitive trust is likely to be the (or a) consequence of transformational leadership and the antecedent of collective efficacy, this study argues that the impact of transformational leadership on collective efficacy is likely to come from its mediating effect via team cognitive trust.

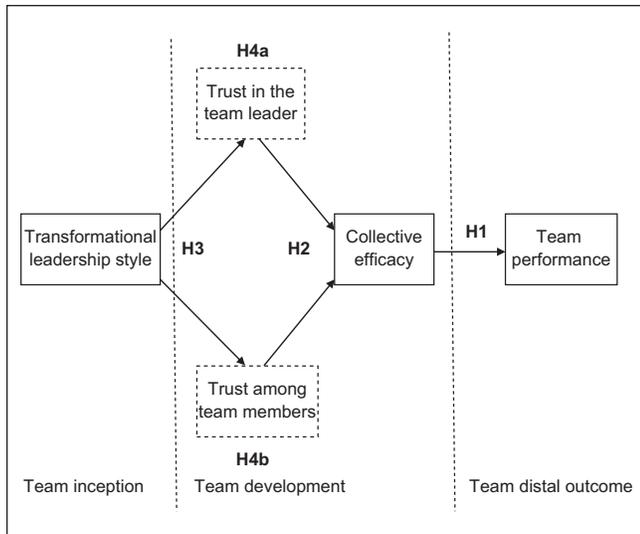
Based on the arguments and evidences above, this study therefore proposes that team cognitive trust mediates the transformational leadership-collective efficacy relationship (cf., Figure 1).

*Hypothesis 4:* A transformational leadership will have an indirect positive effect, mediated through cognitive trust in the team leader on collective efficacy.

*Hypothesis 5:* A transformational leadership will have an indirect positive effect, mediated through cognitive trust among team members on collective efficacy.

## Method

The aim of this study was to empirically examine the proposed model with collective efficacy and team cognitive trust as the mediators of the transformational leadership-team performance relationship. The research questions to be addressed in this study include the following: (a) how do



**Figure 1.** Research framework.

transformational leadership and team cognitive trust influence collective efficacy, which in turn affects team performance; and (b) is team performance affected by a series of mediating processes? A survey was conducted to empirically examine the proposed model. The original instrument adopted in this study is the English version, and therefore a panel of experts including authors was responsible for translating the instrument into Chinese. First, one author translated the original instrument into Chinese. Therefore, another author screened and corrected the error of the translation. Finally, the first author administered a panel meeting to refine the translation. To validate the Chinese version instrument, several master students in the management college of university in northern Taiwan were invited to participate in a pilot test. According to the feedback from the participants and the result of the pilot test, the Chinese version instrument was refined again.

### Sample and Data Collection

The sample consisted of various team types from different organizations in Taiwan. Multiple members from each team were invited to answer the questionnaires. Kumar, Stern, and Anderson (1993) indicated that data collected from a single informant were highly correlated with team consensual data. However, one may raise some concerns about the reliability and validity of informant report as we asked only one member of a team to answer the questionnaire. To ensure that the responses were representative of that team, two members of each team were randomly picked to answer the questionnaire. The calculation of interrater reliability ( $R_{wg}$ ; James, Demaree, & Wolf, 1984) was used to determine whether the two team members' responses were correlated.

A total of 320 questionnaires were distributed to 160 teams in organizations in Taiwan, and 98 questionnaires were returned. Of these, 92 questionnaires from 46 teams were valid, yielding a response rate of 28.75%. The number of people per team ranged from 3 to 35 with an average of 8.78 people. The average duration for a team was 32.5 months, with a range of 4 to 120 months. Team types included IS (information systems) integration (12), quality improvement (11), R&D (7), business management (5), customer service (3), production (1), sales (1), and others (6). A total of 27 teams (58.7%) were temporary in nature.

### Measures

The instruments used to measure research variables are described below.

**Transformational leadership style.** Twenty-four items adapted from Cheung, Ng, Lam, and Yue (2001) were used to measure four aspects of transformational leadership of the project team leader. Each aspect of transformational leadership including charisma, inspirational motivation, intellectual stimulation, and individualized consideration was measured by six items, respectively. The items wordings were refined to adapt to the team's context. Respondents were asked to judge each statement in terms of their team leader's overall leadership behavior based on their experiences in that specific team. They were to evaluate how frequently, on average, their team leader displayed the described behaviors on a 5-point response scale (from 1 = *never* to 5 = *always*). A sample item for charisma was, "The project team leader makes the team members enthusiastic about the project." A sample item for individualized consideration was, "The project team leader finds out what I want and helps me to get it." A sample item for intellectual stimulation was, "The project team leader enables me to think about old problems in new ways." A sample item for inspirational motivation was, "The project team leader stimulates enthusiasm among project team members for the work of group." Cronbach's alpha coefficient was = .975, which exceeds the recommended level of .70 (Nunnally, 1978).

**Team cognitive trust.** The measures were adapted from Kanawattanachai and Yoo (2002). Scale items were revised to measure two types of team cognitive trust: cognitive trust among team members and cognitive trust in the team leader. Four items measuring each type of trust were used using a 5-point Likert-type scale (from 1 = *strongly disagree* to 5 = *strongly agree*). A sample item for cognitive trust in the team leader is, "I see no reason to doubt my team leader's competence and preparation for the job." A sample item for cognitive trust among team members is, "I see no reason to doubt my teammates' competence and preparation for the job." Cronbach's alpha coefficients for cognitive trust in the team leader and for trust among team members were = .848 and

**Table 1.** Descriptive Statistics, AVE, Composite Reliability, and Correlation Matrix of Studied Variables ( $n = 39$ ).

Constructs	1	2	3	4	5
1. Transformational leadership style	<b>.846</b>				
2. Cognitive trust in the team leader	.758**	<b>.826</b>			
3. Cognitive trust among team members	.507**	.398*	<b>.838</b>		
4. Collective efficacy	.576**	.538**	.638**	<b>.808</b>	
5. Team performance	.644**	.608**	.582**	.676**	<b>.876</b>
M	3.411	3.853	3.850	3.733	3.603
SD	.683	.429	.452	.424	.560
Composite reliability	.977	.895	.876	.904	.952

Note. Value on the diagonal is the square root of AVE. AVE = average variance extracted.

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

.799, respectively, which exceeded the threshold of .7 (Nunnally, 1978).

**Collective efficacy.** Five items measuring collective efficacy was adapted from Jung and Sosik (2002). Wordings were adapted to adjust to the project team context. Five items were measured on a 5-point Likert-type scale (from 1 = *strongly disagree* to 5 = *strongly agree*). A sample item was, "My project team can find solutions to problems with its performance." Cronbach's alpha coefficient was = .868, which exceeded the recommended level of .7 (Nunnally, 1978).

**Team performance.** This research adapts six items of Hoegl and Gemuenden's (2001) measure to assess team performance. Efficiency refers to the adherence to schedules and budgets. Effectiveness refers to the degree to which the team meets expectations regarding the quality of the outcome. In other words, effectiveness reflects the assessment of outcomes, while efficiency is the assessment of input. Each question was measured on a 5-point Likert-type scale (from 1 = *strongly disagree* to 5 = *strongly agree*). A sample item of effectiveness was, "From the company's perspective, all project goals were achieved." A sample item of efficiency was, "From the company's perspective, one could be satisfied with how the project progressed." The value of Cronbach's alpha was = .939, which exceeded the threshold of .7 (Nunnally, 1978).

## Results

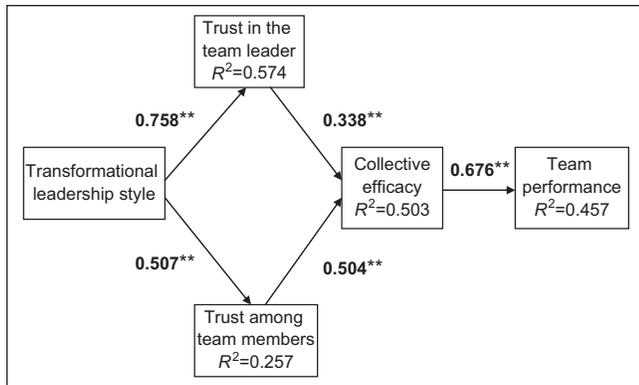
Model testing and data analysis were tested using the partial least squares (PLS) approach. The PLS approach is suitable for research with a small sample size (Chin, Marcolin, & Newsted, 2003). According to Chin et al.'s (2003) suggestion, the sample size requirement for the PLS approach should equal to or above 10 times the largest numbers of structural paths directed toward a particular construct. As depicted in Figure 1, the largest numbers of structural paths are two paths directed to collective efficacy, which indicated that the requirement for sample size in our proposed model

should be equal to or above 20 teams. The sample size of this study is 46 samples and therefore satisfies the requirement.

This study calculates interrater reliability ( $R_{wg}$ ; James et al., 1984) to investigate within-group agreement on the rating for each team. Out of the 46 teams' interrater reliability coefficients for constructs, 7 did not exceed the threshold levels of reliability (.7) as suggested by George (1990) and were dropped from subsequent analysis. For transformational leadership, the average  $R_{wg}$  coefficients of charisma, inspirational motivation, intellectual stimulation, and individualized consideration were .967, .970, .968, .957, and .98, respectively. The average  $R_{wg}$  coefficients of cognitive trust in the team leader, cognitive trust among team members, collective efficacy, and team performance were .970, .966, .972, and .971, respectively.

## Measurement Model

Confirmatory factor analysis was first conducted to assess the measurement model. Cronbach's alpha and composite reliability were used to examine reliability. As shown in previous paragraphs, all of the Cronbach's alphas were well above .7, the threshold suggested by Nunnally (1978), indicating the scale reliability of all major variables reached an acceptable level. As shown in Table 1, the composite reliability coefficients were all above .6, as suggested by Fornell and Larcker (1981). Convergent validity was assessed by examining the average variance extracted (AVE) from the measures (Hair, Black, Babin, Anderson, & Tatham, 2006). Table 1 shows that the values of AVE were all above the threshold of .5 (Fornell & Larcker, 1981). Discriminant validity was confirmed by looking at the square root of AVE. The values of the square root of AVE (depicted in Table 1) were all larger than the interconstruct correlations (Fornell & Larcker, 1981). The variance inflation factor (VIF) that measures whether the collinearity existed was assessed. The values of VIF for all constructs are smaller than the threshold value of 10 (Hair et al., 2006). The result indicated that the collinearity effect in the constructs studied was not significant.



**Figure 2.** Results of PLS analysis.

Note. PLS = partial least squares.

\*\* $p < .01$ .

### Structural Model

Figure 2 illustrates the path coefficients of the proposed research model. All of the path coefficients were significant. Constructs depicted in dashed lines represent mediating variables ( $n = 39$ ). All path coefficients are statistically significant at .01 level.

Hypothesis 1 examined the association between collective efficacy and team performance. The path coefficient of collective efficacy to team performance is positive and significant ( $\beta = 0.676$ ,  $p < .01$ ). Therefore, Hypothesis 1 was supported.

Hypothesis 2 tested the relative impacts of two types of team cognitive trust on collective efficacy. The path of cognitive trust among team members to collective efficacy was significant ( $\beta = 0.504$ ,  $p < .01$ ), whereas the path from cognitive trust in the team leader to collective efficacy was also significant ( $\beta = 0.338$ ,  $p < .01$ ) but smaller than the path from cognitive trust among team members to collective efficacy. The result revealed that cognitive trust among team members has stronger positive impacts on collective efficacy than cognitive trust in the team leader does. Therefore, Hypothesis 2 was supported.

Hypothesis 3 tested whether the impact of a transformational leadership style on cognitive trust in the team leader is greater than its impact on cognitive trust among team members. The path coefficient of transformational leadership style to cognitive trust in the team leader was positively

significant ( $\beta = 0.758$ ,  $p < .01$ ) and the magnitude is larger than the path coefficient of transformational leadership to cognitive trust among team members ( $\beta = 0.507$ ,  $p < .01$ ). Thus, Hypothesis 3 was supported.

Hypothesis 4 and Hypothesis 5 examined whether team cognitive trust mediates the transformational leadership–collective efficacy relationship. The Sobel test (1982) was used to examine the mediation effect of team cognitive trust. Two independent PLS models exemplified by the SmartPLS 2.0 bootstrap procedure with 200 re-samples were conducted to generate the necessary  $t$  values. Model 1 included two paths from transformational leadership (the independent variable) to cognitive trust in the team leader and cognitive trust among team members (two mediators). Model 2 included two paths from cognitive trust in the team leader and cognitive trust among team members (two mediators) to collective efficacy (the dependent variable). As depicted in Table 2, the showed  $t$  values and the corresponding  $z$  values for the Sobel test were all significant. The results indicated that cognitive trust in the team leader mediated the impact of transformational leadership on collective efficacy ( $z$  value for the Sobel test = 4.837,  $p < .01$ ) and the effect of transformational leadership on collective efficacy was also significantly mediated by cognitive trust among team members ( $z$  value for the Sobel test = 4.869,  $p < .01$ ). Thus, Hypothesis 4 and Hypothesis 5 were supported.

### Discussion

In attempting to understand the roles of cognitive trust and collective efficacy in the transformational leadership–team performance relationship, this study proposed five hypotheses with aims to examine how transformational leadership and cognitive trust affect collective efficacy, which therefore influences team performance. The result of the study supported all five hypotheses confirming the intertwined relationships between transformational leadership style, team cognitive trust, collective efficacy, and team performance.

The significant impact of collective efficacy on team performance (Hypothesis 1) was consistent with prior research findings (Gully et al., 2002; Tasa et al., 2007). The formation of collective efficacy by way of the impact of two types of team cognitive trust was confirmed (Hypothesis 2). In particular, this study found that collective efficacy was enhanced

**Table 2.** The Results for Testing Mediating Effect.

Model 1		Model 2			
Path	$t$ value	Path	$t$ value	Sobel test	$p$ value
Transformational leadership style → Cognitive trust in the team leader	15.544	Cognitive trust in the team leader → Collective efficacy	5.090	4.83725705	.00000132
Transformational leadership style → Cognitive trust among team members	7.013	Cognitive trust among team members → Collective efficacy	6.764	4.86851886	.00000112

more by cognitive trust among team members more than by cognitive trust in the team leader. Therefore, cognitive trust among team members is also a necessary element of team trust in exploring the formation of collective efficacy. The confirmation of Hypothesis 3 revealed that transformational leadership had a greater association with cognitive trust in the team leader than with cognitive trust among team members. Cognitive trust in the team leader and cognitive trust among team members significantly mediated the transformational leadership–collective efficacy relationship (Hypotheses 4 and 5). Transformational leadership style affected collective efficacy by way of cognitive trust in the team leader and cognitive trust among team members. That is, through team cognitive trust, transformational leadership will help foster a team's collective efficacy and leads to the distal outcome: team performance. In other words, the impact path from transformational leadership to team performance is by way of team cognitive trust and collective efficacy. Cognitive trust in the team leader and cognitive trust among team members extend the influence of a transformational leadership style to collective efficacy and then ultimately to the proximal outcome, team performance.

In summary, the confirmations of five hypotheses provided a satisfactory answer to the research question: team performance was affected by a series of mediating process wherein transformational leadership through cognitive trust influenced collective efficacy (the proximal outcome) and ultimately led to team performance (the distal outcome).

## Conclusion

Accumulated literatures have evidenced the causal linkage between transformational leadership and team cognitive trust (e.g., Zhu et al., 2013). The inquiry regarding how transformational leadership and team cognitive trust affect collective efficacy and therefore affects team performance has not been well understood in previous research. The present study provided the initial step to explore how team cognitive trust mediates the impact of transformational leadership on collective efficacy. We empirically assessed the antecedents (transformational leadership) and consequences (collective efficacy) of team cognitive trust. The transformational leadership directly helped foster members' cognitive trust in the team leader and cognitive trust among team member. As team cognitive trust in the leadership process increased, the collective efficacy of a team was enhanced accordingly, which in turn helped to lead to better team performance.

## Academic Implications

Our research contributes the following to academic research. First, this study conceptualized team cognitive trust as a two-dimensional construct: cognitive trust in the team leader and cognitive trust among team members. Such a conceptualization of team cognitive trust not only broadens the

boundary of team trust beyond trust “in the leader” but also closely reflects the real cognitive aspects of a team. We suggest that team cognitive trust may simultaneously emerge in the interaction among team members and leaders as well as during the teamwork process. In summary, this study helps to describe the two referents of cognitive trust as two separate process variables in the transformation leadership processes.

Second, we characterized team cognitive trust using two referents, cognitive trust in the leader and cognitive trust among team members. The findings confirmed that two distinct constructs of team cognitive trust can be empirically classified, and the development of collective efficacy is largely dependent on cognitive trust among team members. Such a classification is beneficial for comparing which type of team cognitive trust contributes more to collective efficacy.

Finally, the study incorporated the model of collective efficacy from social cognitive theory into the framework of trust in leadership theory. We theorized and validated the causal relationships between transformational leadership, cognitive trust, collective efficacy, and the team's performance as a chain. Consistent with Burke et al.'s (2007) framework, our findings empirically confirmed that team cognitive trust under the transformational leadership process was related to proximal outcomes (collective efficacy) and distal outcomes (team performance). In conclusion, the findings offer theoretical and empirical valuable insights into how transformational leadership impacts team performance through various mediating variables.

## Managerial Implications

Our study provides some managerial implications for team practices. This study confirmed the two elements of team cognitive trust, which is cognitive trust in the team leader and cognitive trust among team members. Specifically, cognitive trust in team leader and cognitive trust among team member mediated the impact of transformational leadership on collective efficacy which, in turn, led to better team performance. Therefore, effectively developing team cognitive trust including cognitive trust in the team leaders and cognitive trust among team member is a critical issue in the team context. Team leaders or managers should work on being active transformational leaders to help foster team members' cognitive trust in the team leader and cognitive trust among team members, which in turn will facilitate the development of collective efficacy and ultimately enhance team performance.

## Limitations and Future Research

The target scope of the study primarily focused on how cognitive trust and collective efficacy intervene in the transformational leadership–team performance relationship at team

level. The result of the study provided empirical support for our proposed model and further confirmed the important role of team cognitive trust in the transformational leadership process. Nevertheless, data analysis solely targeted at team level and some other process variables naturally associated with the transformational leadership were not incorporated into the proposed model. Some limitations remain, and future implications are described as follows.

First, to gain a clearer understanding of the evolution of team trust in the leadership process, a complementary longitudinal research design is suggested. Recent studies on group research have highlighted the development of cognitive trust and affective trust in the team process (Webber, 2008; Zhu et al., 2013). For example, Webber's (2008) study exploring the development of affective and cognitive trust in student project teams revealed that affective trust emerges early in the early stage of team development, whereas cognitive trust does not. Conversely, Kim, Ferrin, Cooper, and Dirks (2004) suggested that the early development of trust is likely to be determined by its cognitive dimensions, such as group membership and reputation. Obviously, what types of trust emerges in the early stage of team development still remains blurred. Therefore, future research should examine the development of affective and cognitive trust in the team leader and among team members longitudinally to clarify their relationship in the team development process.

Second, the effects of selected control variables such as physical versus virtual teams, team size, and task type should be studied in future research. The low response rate of 28.75% and the small sample size of 39 teams in the present study limited this possibility. A larger sample size should be included in the future research to capture the effects of team size and task type.

Third, self-reported team performance may bias the results. Future research may avoid this by collecting multiple measures of team performance, such as supervisor's evaluations of team performance or a team's key performance indicator (KPI). In addition, the finding of the study described a sample from project teams. The generalizability to different contexts, such as an educational context or a sporting context, should be assumed with caution in future research.

Fourth, this study only focused on how transformational leadership is associated with selected group variables, including cognitive trust and collective efficacy. There remain many other group variables, such as identification (Wang & Howell, 2012) and cohesion (Nielsen & Daniels, 2012), that could bond team members together, in achieving group outcomes. Further research may explore the roles of these factors in the transformational leadership processes.

Finally, multilevel investigations of the transformational leadership into the team development process and follower outcomes have received many attentions recently (e.g., Nielsen & Daniels, 2012; Wang & Howell, 2012). A multi-level investigation of the transformational leadership in

relation to trust, efficacy, identification, and cohesion may provide our richer understandings of how team performance and follower outcomes could be achieved by series of mediating process.

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### Author Biographies

**Huey-Wen Chou** is a professor at the Department of Information Management, National Central University in Taiwan. She received her PhD from University of Illinois at Urbana-Champaign. Her research interests include team dynamics, ERP, organizational change, virtual team and virtual community learning and performance.

**Yu-Hsun Lin** is an Assistant Professor at the Department of Business Management, Ming Chi University of Technology in Taiwan. He received his PhD from the Department of Information

Management, National Central University, Taiwan. His current research interests include: team innovation, team learning, and internet research.

**Hsiu-Hua Chang** completed her PhD at the Department of Information Management, National Central University, Taiwan. Her primary research interest is in the learning and usage of the enterprise resource planning (ERP) system.

**Wen-Wei Chuang** is a Master of the Department of Information Management, National Central University, Taiwan.