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Transformational leadership influence on unit performance

Cross-level moderated mediation evidence

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TFL influence
on unit
performance

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Abstract

Purpose – The purpose of this paper is to explore the role of mediation and moderation mechanisms between firm-level effects of transformational leadership (TFL) on unit-level performance across levels.

Design/methodology/approach – The authors used surveys to collect data from 800 senior managers at the firm level and 1377 unit managers from 800 units of 100 firms from semiconductors, optoelectronics, computer electronics, and telecommunications industries. The industries were chosen because these firms focus on expanding their businesses and encourage extensive knowledge sharing among the firms and at all levels within the organizations.

Findings – In this study, the authors theorized that firm-level effects of TFL on unit-level performance across levels were positively related to unit-level performance. Unit-level knowledge sharing mediates the positive relationship between firm-level TFL and unit-level performance. A cross-level interaction effect of firm-level TFL and unit-level absorptive capacity showed that a positive unit-level absorptive capacity enhanced firm-level influence of TFL on unit-level knowledge sharing. Unit-level absorptive capacity moderates the positive relationship between unit-level knowledge sharing and unit-level performance.

Originality/value – First, the authors attempt to integrate the leadership and knowledge management research by exploring the critical mediator of unit-level knowledge sharing in explaining the effects of firm-level TFL on employees' performance at the unit level. This approach is important because it extends the research areas of the two fields, and also clarifies issues regarding how and why TFL at the top of the organization positively impacts the performance of employees at a lower level of the organizational hierarchy. Second, the effectiveness of firm-level TFL depends on the absorptive capacity of each unit. The importance of absorptive capacity and the consequences of leadership behaviors have been emphasized in studies.

Keywords Knowledge sharing, Transformational leadership, Absorptive capacity, Cross-level moderation mediation evidence, Unit performance

Paper type Research paper

Introduction

Research on transformational leadership (TFL) indicates that TFL can be defined as the style of leadership that can engage the organization's employees and encourage them to achieve the firm's targets. Transformational leaders can be used to promote better performance by motivating individuals to collaborate in the pursuit of the firm's higher-level objectives (Bass and Avolio, 2000; Sun *et al.*, 2014). Meta analytic researches also indicate that transformational leaders are influential on outcomes at both the team level and the firm level (Lin *et al.*, 2016). Hence, there is merit in further research into the mechanisms through which TFL encourages unit-level performance (Wang *et al.*, 2011).

Although the concept of TFL was initially targeted at chief executive officers (CEOs) (Burns, 1978), most studies on TFL have focused on "the close relationships (i.e. the direct interactions between the leader and employees) at lower levels of the managerial hierarchy" (Ling *et al.*, 2008, p. 924). Few attempts have been made to explore the effects of firm-level senior executives' transformational efforts on their subordinates' knowledge sharing process and absorptive capacity (i.e. the ability to acquire, assimilate, transform, and



exploit) and performance at the unit level (Cohen and Levinthal, 1990). This omission is not unusual given the fact that successful transformational leaders at the firm level must encourage and promote a healthy, open environment at the unit level to ensure the best results from that unit (Wang *et al.*, 2011). If these leaders are successful, they are often rewarded with disproportionately prestigious positions in regions of East Asia, including Taiwan (Huang *et al.*, 2006).

This study investigates the mediating mechanism and boundary conditions across levels, or the so-called “blackbox” (Dionne *et al.*, 2004), between TFL at the firm-level and unit-level performance. Hence, the research problem in this study is to explore the intermediate mechanisms across organizational levels (i.e. firm and unit levels) between firm-level TFL and unit performance. Most specifically, this study elucidates the mediating role of unit-level knowledge sharing between firm-level TFL and unit performance. Also, this research examines the moderating mechanism of unit-level absorptive capacity between the relationship of firm-level TFL and unit-level knowledge sharing and the moderating mechanism of unit-level knowledge sharing and unit performance. In other words, the research gaps identified in this study are the lack of exploration of cross-levels mechanism and moderation mechanisms between firm-level TFL and unit performance. This echoes previous studies’ (e.g. Braun *et al.*, 2013; Crossan *et al.*, 1999) call for multilevel research regarding unblocking the TFL and followers’ performance.

This study has several contributions. First, we attempt to integrate the leadership and knowledge management research by exploring the critical mediator of unit-level knowledge sharing in explaining the effects of firm-level TFL on employees’ performance at the unit level. This approach is important because it extends the research areas of the two fields, and also clarifies issues regarding how and why TFL at the top of the organization positively impacts the performance of employees at a lower level of the organizational hierarchy (Dionne *et al.*, 2004; Whetten, 1989). Second, the effectiveness of firm-level TFL depends on the absorptive capacity of each unit (Jansen *et al.*, 2005). The importance of absorptive capacity (i.e. the ability to acquire, assimilate, transform, and exploit information) and the consequences of leadership behaviors have been emphasized in studies (Bass *et al.*, 2003; Zahra *et al.*, 2000). Therefore, we include unit-level absorptive capacity in our theoretical model to fully explore how TFL at the firm level affects employee performance at the unit level through the absorptive capacity of that unit. Finally, to totally capture the effects of TFL on employee performance at different levels (Kark and Shamir, 2002; Liao and Chuang, 2007), we conceptualize and empirically test theoretical arguments regarding TFL at the firm level and lower levels on the organizational ladder. Figure 1 portrays our theoretical model.

Theoretical background and hypotheses

Leadership theories can be classified into the following approaches – great man theory, trait theory, behavior theory, contingent theory, relational theory, transactional leadership, TFL, authentic leadership, and servant leadership (Singh and Naqshbandi, 2015). The great man

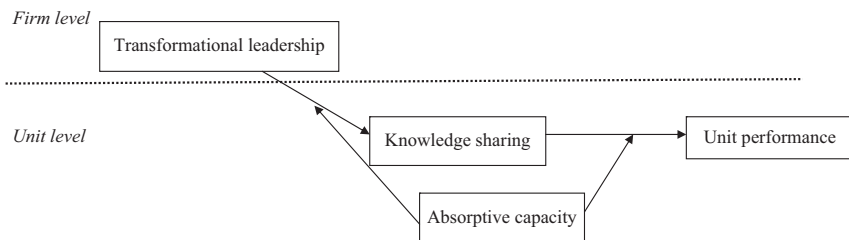


Figure 1.
Transformational leadership and unit performance: cross-level moderation mediation framework

theory specifies that leadership is inbuilt. This means a leader is born with great leadership traits. Following the great man theory is the trait theory, which examines main features of leaders who are successful. After this, behavioral theory proposes that managers' leadership can be trained by militating successful managers' leadership competency. Contingent theory focuses on the effects of situational and contextual variables on leaders' behaviors. Relational theory aims to examine the interpersonal relationship process between leaders and organizational outcomes. Transactional leadership focuses on the exchanges between leaders and followers (Burns, 1978; Singh and Naqshbandi, 2015). Authentic leadership emphasizes that leaders can make transparent decisions with high levels of self-awareness when they are clearly aware of their own existence and the context they are operating (May *et al.*, 2003; Singh and Naqshbandi, 2015). Servant leadership refers to leaders with a practice of a guiding vision and purpose, loving, trusting, and empowering others (Singh and Naqshbandi, 2015). TFL has been viewed as one of the main leadership theories that are used to facilitate organizational outcomes in a competitive environment (Singh and Naqshbandi, 2015).

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performance

The TFL theory emphasizes the role of transformational leaders in motivating their employees to exceed expectations, improving performance across all levels of the organization (Wang *et al.*, 2011). According to Bass (1985), transformational leaders encourage their employees to perform at a higher level by demonstrating four behavioral characteristics: idealized influence – subordinates respect and admire charismatic leaders; inspirational motivation – leaders motivate employees by sharing their vision for the company/unit; intellectual stimulation – leaders encourage and assist their subordinates to be innovative in their thinking and tackle problems in novel ways; and individual consideration – leaders show genuine concern about their subordinate's needs and pay attention to them. Previous studies have recognized a positive connection between TFL and employee performance by using cross-sectional surveys, and longitudinal, experimental, and multisource research designs (e.g. Judge and Piccolo, 2004; Liao and Chuang, 2007). Transformational leaders are effective because they can increase and assess followers' interest, create attentiveness, and produce benefits among followers of the unit's assignment. Most prominently, transformational leaders can inspire followers to achieve more than the expectation of the unit for the interests of the unit (Singh and Naqshbandi, 2015). Also, transformational theory is effective because they can help leaders to renovate the organizations when a leader can define the direction for variation, create new visions, and activate commitment to these visions (Singh and Naqshbandi, 2015).

Bass (1999) proposed that "much more explanation is needed about the inner workings of TFL" (Bass, 1999, p. 24). Since then, many studies have focused on how organizational learning mechanisms and innovation at the firm level mediate the relationship between TFL and subordinate performance at the organizational level (e.g. García-Morales *et al.*, 2012). Previous studies (e.g. Chang *et al.*, 2017) revealed that unit-level TFL had a direct effect on unit-level corporate entrepreneurship, the mediation effect of unit-level collective efficacy between unit-level TFL and unit corporate entrepreneurship, and the cross-level moderating effect of a firm-level empowerment climate on the indirect effect of unit-level collective efficacy on the relationship between the unit-level TFL and unit corporate entrepreneurship. The link between knowledge sharing and the transformational leader-subordinate performance at the unit level remains unexamined. Moreover, it remains unclear whether the effects of TFL at the firm level lead to better performance at the unit level under the establishment of moderating mechanisms, such as absorptive capacity, at the unit level.

Following Kark and Shamir's (2002) multilevel TFL framework, we examine the effects of TFL at the senior executives' level of the firm on the lower levels of organizational

hierarchies such as unit level. In general, transformational leaders at the firm level mentor their subordinates, recognize their abilities and encourage their contributions. Consequently, we propose that transformational leaders at the firm level positively impact the performance of their subordinates through the promotion of knowledge sharing at the unit level. Moreover, this knowledge sharing results in better unit-level performance through building a moderating mechanism of recipient absorptive capacity at the unit level. In the following sections, we introduce the proposed mechanisms that link TFL at the firm-level and unit-level knowledge sharing, unit-level absorptive capacity, and unit-level performance. We focus on knowledge sharing and absorptive capacity at the unit level because knowledge sharing within the unit was positively related to absorptive capacity of recipients at the unit level (Reagans and McEvily, 2003; Szulanski, 1996).

The relationship between firm-level TFL and unit-level performance: the mediating role of unit-level knowledge sharing

Previous studies on TFL indicate that transformational leaders at the firm level can encourage their subordinates to share their knowledge (e.g. Bass, 1985). These studies further propose that transformational leaders at the firm level are critical in facilitating shared ideas and knowledge among subordinates. This is because unit-level employees value encouragement and challenges from their leaders (Bryant, 2003). A TFL style at the firm level encourages employees to be innovative, solve problems, and generate solutions (Bass, 1985). Knowledge sharing at the unit level is not an automatic process and transformational leaders have the potential to affect the extent of knowledge sharing (Srivastava *et al.*, 2006). Transformational leaders can create opportunities and processes that can motivate and encourage knowledge sharing amongst unit subordinates. For instance, by providing new ideas, demanding technical solutions, and inspiring new ways to work, transformational leaders can initiate unit discussions and reviews that lead to unit-level knowledge sharing. Transformational leaders can show by example that the open sharing of ideas and information is crucial to the units' performance and survival. If this role modeling is successful, subordinates are likely to respond in a positive manner, and share their expertise and knowledge with the unit. Moreover, transformational leaders are able to react and respond to new ideas and information and initiate novel approaches to unit tasks. Transformational leaders at the firm level can also offer new solutions and approaches to their subordinates to achieve their expected unit-level goals (Crossan *et al.*, 1999; Shamir *et al.*, 1993). In addition, research on TFL perspectives revealed that transformational leaders at the firm level can predict the extent of knowledge sharing at the unit level (Srivastava *et al.*, 2006). Also, several meta-analyses have indicated that transformational leaders at the firm level have a positive impact on outcomes and performance at the unit level (e.g. Judge and Piccolo, 2004). For instance, Judge and Piccolo (2004) revealed a positive relationship between transformational leaders at the firm level and group and unit performance. Consequently, we expect that:

- H1.* Unit-level knowledge sharing mediates the positive relationship between firm-level TFL and unit-level performance.

The relationship between firm-level TFL and unit-level knowledge sharing: the moderating role of unit-level absorptive capacity

We expect that the positive relationship between firm-level TFL and unit-level knowledge sharing will be moderated by the absorptive capacity at the unit level. Unit-level absorptive capacity includes four elements: identifying and understanding external knowledge; sharing external knowledge; incorporating it with existing knowledge; and applying the new knowledge to commercial ends (Cohen and Levinthal, 1990; Zahra and George, 2002).

Previous studies have conceptualized and measured absorptive capacity as a single construct (Cohen and Levinthal, 1990; Szulanski, 1996). More recently, a meta-analysis treated absorptive capacity as a single variable within the field of knowledge transfer research (e.g. Van Wijk *et al.*, 2008). In line with Cohen and Levinthal (1990), this study conceptualized absorptive capacity as one construct, as all elements are necessary and jointly affect the extent of knowledge sharing among unit members to create greater unit-level performance.

By extending the perspective of absorptive capacity, this study suggests that unit-level knowledge sharing can be promoted in two ways. First, if firm-level transformational leaders encourage knowledge sharing, it is generally successful and leads to better performance at the unit level. Second, unit-level knowledge sharing can become part of the unit's culture, becoming integrated with existing practices. When transformational leaders encourage knowledge sharing, there is a higher unit-level absorptive capacity, which leads to more efficient accumulation and exchange of knowledge.

Unit-level absorptive capacity may moderate the relationship between firm-level TFL and unit-level knowledge sharing for several reasons. First, knowledge sharing among unit members requires transformational leaders at the firm level to encourage and act as role models in the promotion of the activity. The theory of knowledge management proposes that successful knowledge sharing at the unit level relies on the receptiveness of the employees (Easterby-Smith *et al.*, 2008). It is possible that transformational leaders at the firm level are capable of and committed to encouraging their subordinates to share knowledge, but these subordinates may lack the experience and confidence to incorporate this new skill into their routine. (Cohen and Levinthal, 1990). Second, the sharing of information and new opportunities at the unit level can also depend on the unit-level absorptive capacity based on their experience (Cohen and Levinthal, 1990). Consequently, a strong unit-level absorptive capacity ensures that the newly acquired information and knowledge is properly interpreted and the appropriate conclusions about these opportunities are drawn (Zahra and George, 2002). In other words, when firm-level transformational leaders interact in a positive way with their subordinates, it is likely that a higher level of unit-level absorptive capacity and knowledge sharing will result in better performance. This is because individuals in a unit with a higher level of absorptive capacity can better interpret and evaluate new information about promising opportunities. This should result in the unit being able to function more efficiently, perhaps at a comparatively lower cost (Engelen *et al.*, 2014). By contrast, units with a low absorptive capacity are likely to have less success in evaluating their opportunities because they lack the knowledge base of their more successful competitors. The reasoning above suggests that lower (greater) unit-level absorptive capacity would weaken (strengthen) the relationship between firm-level TFL and unit-level knowledge sharing. To sum up, we hypothesize:

- H2.* The relationship between firm-level TFL and knowledge sharing at the unit level is stronger when unit-level absorptive capacity is greater.

The relationship between firm-level TFL and unit-level performance: the moderating role of unit-level absorptive capacity

We expect that a unit's absorptive capacity may also moderate the relationship between knowledge sharing and performance at the unit level. First, previous studies (e.g. Szulanski, 1996) revealed that successful knowledge transfer/sharing was difficult if the recipient had a low absorptive capacity. When a unit has a strong absorptive capacity, it is easier for members to integrate or combine new knowledge into existing routine and practice. This integration generates novel and valuable knowledge (Smith *et al.*, 2005) that can potentially be integrated into unit performance and become more widely applied

and accepted. This ideally would lead to a better performance at the unit level. Second, a unit with a higher level of absorptive capacity has stronger communication with and cooperation among its employees (Zahra and Hayton, 2008). Thus, the sharing of knowledge among unit members will be more flexible and faster than a unit with conflicts and poor communication (De Clercq *et al.*, 2010). Also, stronger communication and knowledge sharing in a unit can ensure a healthy examination of the diverse perspectives of an opportunity, leading to a more positive outcome. (Kearney *et al.*, 2009). By contrast, a unit lacking absorptive capacity may need more time to deal with issues and may miss opportunities to obtain and utilize new knowledge, leading to poor performance. Third, a unit with a higher level of absorptive capacity can support unit members in acquiring new knowledge and information regarding their competition in new market segments (Zahra and George, 2002). Moreover, a unit with a strong absorptive capacity normally has the potential to leverage their network contacts (e.g. Tsai, 2001) to keep abreast of the newest trends in products and technologies, and to take this new information and integrate it into the units. This in turn can increase unit-level performance. Finally, a unit with a strong absorptive capacity can learn from failure and will perform with more confidence and expectations of success in the future (Engelen *et al.*, 2014). This reasoning suggests that unit-level absorptive capacity may moderate the influence of knowledge sharing at the unit level on performance in such a way that the effect is stronger when unit-level absorptive capacity is greater. Previous research has explored absorptive capacity as an antecedent for knowledge transfer at a single level (Minbaeva *et al.*, 2003) but has not explored whether it moderates the relationship between unit-level knowledge sharing and unit-level performance. Extrapolating from previous research, we hypothesize:

H3. The relationship between knowledge sharing at the unit level and unit-level performance is stronger when unit-level absorptive capacity is greater.

Methodology

Data collection and sample

For this study, we sent a letter of invitation and an anonymous questionnaire to CEOs who were randomly selected from the database of the *Taiwan Economic Journal*. The semiconductors, optoelectronics, computer electronics, and telecommunications industries were chosen because these firms focus on expanding their businesses and encourage extensive knowledge sharing among the firms and at all levels within the organizations (Chuang *et al.*, 2016). Our analysis focused on the unit level. Each unit is a profit center with its own senior management team. We asked the CEO of each firm for permission to conduct the study and requested the contact information of key individuals (in most cases directors of human resources) who could further aid us in identifying supervisor-subordinate dyads within their organization. After identifying senior managers and unit managers (two managers including one general manager and one operation manager), the administrative contact distributed the surveys to them together with a letter of introduction from the CEO (explaining the purpose of the study and encouraging staff to participate) and a return envelope. The survey questions were adapted from papers published in English and translated into Chinese using the back-translation method (Brislin, 1980). This process resulted in an initial sampling pool of 1,050 senior managers (at the firm level) and 2,100 unit managers (at the unit level), all of whom worked at Taiwanese firms involved in semiconductors (15.0 percent), optoelectronics (29.0 percent), computer electronics (21.0 percent), and telecommunications (35.0 percent) in Taiwan across two different time periods in early 2015 and mid-2015. In early 2015 (Time 1), we sent the survey to the 1,050 senior managers (at the firm level) and in mid-2015 (Time 2, six months later), we sent the survey to the 2,100 unit managers selected for participation (at the unit level).

At least two units and at least two unit managers from each unit were surveyed from each firm. At least two senior managers were surveyed at the headquarters of the firms. After 14 weeks with three rounds of reminders, we received responses from 812 senior managers (77.3 percent) and 1,508 managers (71.8 percent). When compiling our final results, we removed those units where we received usable responses from fewer than two unit managers. The final sample consisted of 800 units in 100 firms, with 800 senior managers (76.2 percent) and 1,377 unit managers (65.6 percent). We surveyed an average of 8.0 units (SD: 0.00) from each firm. There was an average of 4.00 managers (SD: 0.00) per unit, and the average number of senior managers per firm 8.00 (SD: 0.00).

To evaluate the non-response bias, we contrasted the firms included in our final sample with those that were eliminated as described above. We found no significant differences between them in terms of the number of full-time general managers or the number of units. We also contrasted early (first 10 percent) and late (last 10 percent) responses to evaluate the non-response bias on each dimension of unit-level performance, but no significant differences appeared.

The firms in our final sample have existed on average for 24.5 years with an average number of 8125.21 employees. The average age of senior managers was 41.86 years and 65.4 percent were male. The average age of unit managers was 33.49 years and 37.2 percent were women.

To remove the common method bias, we collected data from multiple sources across two different time periods. In early 2015, senior managers from the headquarters of the firms rated their CEO's TFL behaviors. Six months later, unit managers rated their unit-level knowledge sharing and absorptive capacity. Finally, we obtained archival unit-level performance data from the TEJ database. We used a Harman one-factor test to examine the common method bias. The results displayed an unacceptable fit and imply that common method concerns do not exist as four factors are extracted with eigenvalues greater than 1; no one factor accounts for most of the variance. We also used a partial correlation procedure (Podsakoff *et al.*, 2003). The results reveal there are no differences: paths neither lose statistical significance, nor change direction, and all moderation and mediation conclusions remain the same. In short, the post-hoc tests mean that the common method bias is unlikely to explain the results found in this study.

Measures

All measurement scales are taken from previous studies. We used the 20-item Multifactor Leadership Questionnaire (MLQ Form 5X-Short) to measure firm-level TFL, developed by previous studies (Avolio *et al.*, 1999), to possess convergent and discriminate validity. The measure has four unique dimensions, and it was adapted on a seven-point scale. Eight senior managers from each firm rated the items. This study followed previous research (e.g. Bass and Avolio, 1995) and used the four dimensions to create an index of TFL. Confirmatory factor analysis (CFA) results indicated that the dimensions of firm-level TFL fitted the data well ($\chi^2/df = 11.90$, CFI = 0.97, GFI = 0.99, TFI = 0.91, RMSEA = 0.08). The tests showed that unit managers from the same firm had high agreement in their rating of the firm-level TFL (mean $r_{wg(j)} = 0.95$, ICC[1] = 0.24, ICC[2] = 0.72).

Measures of unit-level absorptive capacity were adapted from Jansen *et al.* (2005) and measures of unit-level knowledge sharing were adapted from Faraj and Sproull (2000). CFA results of unit-level absorptive capacity indicated that one factor of unit-level absorptive capacity fitted the data well ($\chi^2/df = 53.74$, CFI = 0.98, GFI = 0.99, TFI = 0.95, RMSEA = 0.07). The tests showed that unit managers from the same unit had high agreement in their rating of the unit-level absorptive capacity (mean $r_{wg(j)} = 0.96$, ICC[1] = 0.43, ICC[2] = 0.75). CFA results of unit-level knowledge sharing indicated that one factor of

unit-level knowledge sharing fitted the data well ($\chi^2/df = 28.44$, CFI = 0.99, GFI = 0.99, TFI = 0.99, RMSEA = 0.06). The tests showed that unit managers from the same unit had high agreement in their rating of the unit-level knowledge sharing (mean $r_{wg(j)} = 0.89$, ICC[1] = 0.33, ICC[2] = 0.67). A seven-point Likert-type scale was adapted for all items. The results of exploratory factor analysis (EFA) of principal components factor using varimax rotation show acceptable construct reliability with all values exceeding 0.70. Descriptive statistics are shown in Table I.

To assess unit-level performance, this study used the publicly available database maintained by TEJ, which is the leading credited analysis research agent in Taiwan (Chu, 2004) (equivalent to Standard and Poor's and Moody's in the USA). This study used the unit-level annual gross profit calculated as (unit's sales revenue in 2016 – unit's production costs in 2016) unit's sales revenues in 2016 as the measure of unit-level performance. Following on previous entrepreneurship studies (e.g. Zahra and Covin, 1995), performance is measured one year after the survey data collection.

This study included unit age, size, interdependency and frequency of meetings, with firm size, age, and sector as control variables in the analysis. Both firm age and firm size are controlled because they may be associated with the use of various leadership behaviors such as those that maintain knowledge-intensive teamwork (García-Morales *et al.*, 2012). Unit size was controlled because it can affect intra-unit communication (Ancona and Caldwell, 1992). Unit meeting frequency was controlled because units that meet less often are vulnerable to process losses (Gibson and Cohen, 2003), while face-to-face meetings tend to promote unit cohesion and mutual accountability, which may enhance unit learning (Kirkman *et al.*, 2004). Unit interdependency refers to the extent to which unit members cooperate and work interactively to complete their tasks (Stewart and Barrick, 2000). Unit interdependency can influence unit dynamics in various ways (e.g. Kozlowski and Bell, 2003). Measures of unit interdependency were adapted from Campion *et al.* (1993).

Results

Hypotheses were tested by undertaking a hierarchical linear modeling (HLM) analysis. Table II presents the HLM results for the effects of firm-level TFL on unit-level performance. We followed the test procedures for mediation described in Kenny *et al.* (1998) and controlled for unit-level TFL in the analyses. *H1* predicted that unit-level knowledge sharing mediates the positive relationship between firm-level TFL and unit-level performance. The results from Model 3 revealed that unit-level knowledge sharing does, indeed, mediate the positive relationship between firm-level TFL and unit-level performance ($\gamma = 11.56$, $p < 0.01$, Model 4, Table II). Thus, *H1* is supported.

H2 proposed that unit-level absorptive capacity positively moderates the relationship between firm-level TFL and unit-level knowledge sharing. The results revealed that unit-level absorptive capacity moderates the positive relationship between firm-level TFL and unit-level knowledge sharing ($\gamma = 1.81$, $p < 0.01$, Model 5, Table II). Thus, *H2* is supported.

H3 proposed that unit-level absorptive capacity moderates the effect between unit-level knowledge sharing and unit-level performance. The results revealed that our hypothesis was correct, and unit-level absorptive capacity does moderate the effect of unit-level knowledge sharing between firm-level TFL and unit-level performance ($\gamma = 7.46$, $p < 0.01$, Model 5, Table II). Thus, *H3* is supported.

Figure 2 demonstrates that as unit-level absorptive capacity increases, the slope relating firm-level TFL to unit-level performance becomes more strongly positive. Figure 3 demonstrates that as unit-level absorptive capacity increases, the slope relating firm-level TFL to unit-level performance through unit-level knowledge sharing becomes more strongly positive.

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Unit size	10.72	0.54	-												
2. Unit age	4.93	1.00	0.02	-											
3. Unit meeting frequency	5.01	1.46	0.39***	-0.09***	-										
4. Unit interdependency	4.82	0.72	0.06**	0.11***	-0.12***	-									
5. Firm size	8,125.21	1,036.70	-0.04*	0.11***	0.24***	-0.23***	-								
6. Firm age	24.55	3.50	0.30***	0.10***	-0.02	0.48***	-0.34***	-							
7. Semiconductors	0.15	0.36	-0.14***	0.02	0.04	-0.16***	0.13***	-0.18***	-						
8. Computer electronics	0.21	0.41	0.10***	0.25***	0.01	0.01	0.08***	-0.03	-0.22***	-					
9. Telecommunication	0.35	0.48	0.14***	-0.01	-0.10***	0.15***	-0.27***	0.37***	-0.31***	-0.38***	-				
10. Unit-level knowledge sharing	4.83	0.39	0.10***	0.14***	-0.26***	0.57***	-0.33***	0.58***	-0.22***	0.05	0.23***	-			
11. Firm-level transformational leadership	5.52	0.21	0.10***	0.03	-0.16***	0.42***	-0.31***	0.45***	-0.10***	-0.11***	0.36***	0.48***	-		
12. Unit-level absorptive capacity	5.42	0.31	0.06**	0.10***	-0.20***	0.29***	-0.30***	0.32***	-0.30***	0.13***	0.31***	0.39***	0.38***	-	
13. Unit-level unit performance	2.09	19.35	0.08***	0.15***	-0.15***	0.18***	-0.02	0.28***	-0.06	-0.01	0.37***	0.27***	0.31***	0.24***	-

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

TFL influence on unit performance

Table I.
Means, standard deviations, and correlations

Level and variables	Knowledge sharing (Model 1)	Knowledge sharing (Model 2)	Performance (Model 3)	Performance (Model 4)	Performance (Model 5)
<i>Level 1 (n = 800)</i>					
Intercept	6.63***	6.68***	-441.52***	-517.32***	-473.43***
Unit size	0.02	-0.01	-1.15***	-1.42	-2.49*
Unit age	0.01	0.02**	2.31***	2.17***	2.40***
Unit meeting frequency	-0.06***	-0.05***	-1.55***	-0.87**	-1.19***
Unit interdependency	0.16***	0.17***	2.23**	0.46	1.66
Knowledge sharing				11.56***	0.61
AC		0.06*			5.91
Knowledge sharing × AC					1.81**
<i>Level 2 (n = 100)</i>					
Firm size (log of employees)	-0.42***	-0.39**	44.42***	49.27***	49.70***
Firm age	0.05***	0.04***	1.42***	0.80	1.40**
Semiconductors	-0.12***	-0.05	10.76***	12.10***	11.95***
Computer electronics	0.02	0.05	10.01***	9.84***	9.38***
Telecommunication	-0.11***	-0.07*	20.97***	22.30***	20.81***
Firm-level TFL	0.19***	0.31***	16.22**	14.03**	15.23*
<i>Cross-level</i>					
Firm-level TFL × AC		1.02***			7.46
Pseudo R ²	0.99	0.99	0.09	0.56	0.57

Table II. Hierarchical linear modeling results: effects of firm-level transformational leadership on unit-level unit performance

Notes: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

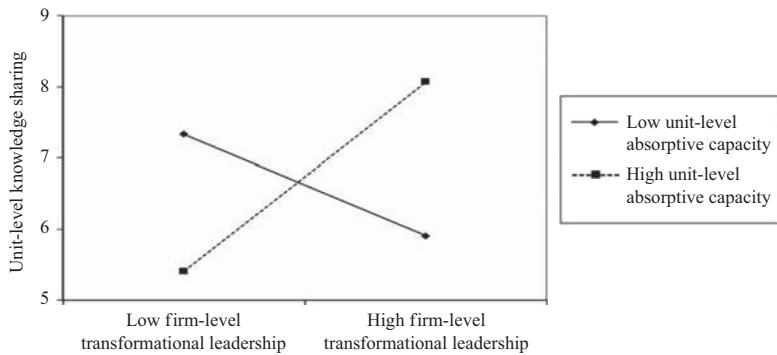


Figure 2. Indirect effect of firm-level transformational leadership (TFL) on unit-level knowledge sharing at low and high levels of unit-level absorptive capacity

We also ran various slope difference tests (Cohen *et al.*, 2003). The results of the slope difference tests indicate that slope differences are significant ($t = 26.98, 48.37, p < 0.01$). This further supports the plots of effects shown in Figures 2 and 3.

Discussion

In this study, we theorized that firm-level effects of TFL on unit-level performance across levels were positively related to unit-level performance. Unit-level knowledge sharing mediates the positive relationship between firm-level TFL and unit-level performance. A cross-level interaction effect of firm-level TFL and unit-level absorptive capacity showed that a positive unit-level absorptive capacity enhanced firm-level influence of TFL on unit-level knowledge sharing. Unit-level absorptive capacity moderates the positive relationship between unit-level knowledge sharing and unit-level performance.

First, the results of a mediating relationship between firm-level transformational leaders and unit performance is a leap ahead in learning the process through which the TFL of top level managers affects the emergence of followers' performance at the lower level of the organizational hierarchy. As line with transformational theory and previous studies (e.g. Bass, 1985; Conger and Kanungo, 1998; Shamir *et al.*, 1993; Wang *et al.*, 2011), TFL is not only related to individual performance but also linked to unit and organizational performance. Consistent with prior studies (Wang *et al.*, 2011, firm-level transformational leaders can express their confidence that units will achieve their goals, resulting in higher levels of unit potency (Bass *et al.*, 2003; Schaubroeck *et al.*, 2007). Furthermore, transformational leaders encourage higher levels of unit cohesion (Bass *et al.*, 2003), which facilitates coordination and cooperation among unit members. This in turn promotes higher level of unit performance and is consistent with prior studies' findings (e.g. Chen *et al.*, 2014).

As anticipated, unit-level knowledge sharing acted as a significant predictor of unit performance. This means firms have superior transformational leaders on site to promote unit performance, but still need unit member to share knowledge and to be better able to run into project goals, reach quality, meet customers' anticipations and complete efficacy (Lee *et al.*, 2010). Specifically, the current study was one of the few attempts to have revealed the mediating effect of unit-level knowledge sharing on a unit's pursuit of desired performance outcomes. That is, the empirical evidence of this study supports the view that research on (transformational) leadership should intentionally separate the unit and firm level of analysis. This result is consistent with calls in previous studies for more research to integrate different levels of analysis (Braun *et al.*, 2013).

Second, this study empirically validated and extended theoretical propositions (Schneider, 2000; Seibert *et al.*, 2004) and empirical findings (Dinh *et al.*, 2014; Spreitzer, 2008) in relation to that there is a cross-level moderating effect of a unit-level absorptive capacity on the direct effect of firm-level TFL and unit-level knowledge sharing. This further complements prior studies (e.g. Jansen *et al.*, 2005) in that absorptive capacity can act an important contextual enhancer across levels. This finding implies that unit employees in this context are more likely to share their knowledge. Accordingly, these unit employees are more positive in executing these tasks within the unit than those employees who do not hold similar knowledge with shared interests and who are not embedded with a high level of unit capacity to acquire, assimilate, transform, and exploit. Furthermore, in line with prior studies in technology-oriented firms (same as our samples), such firms have more resources to foster generating new ideas and are more likely to emphasize the

TFL influence
on unit
performance

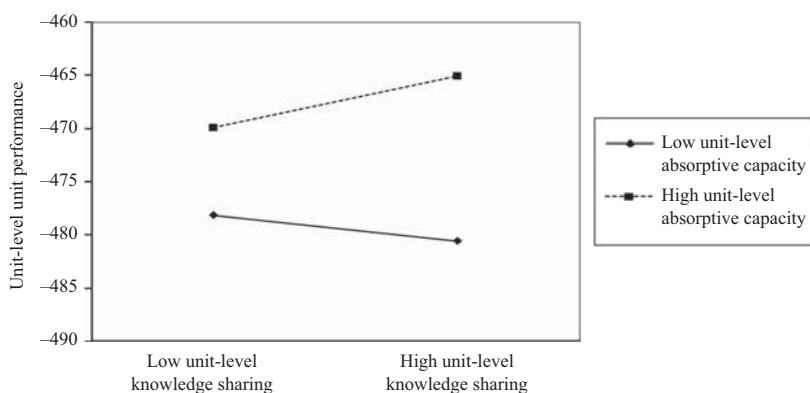


Figure 3. Indirect effect of firm-level transformational leadership (TFL) (via unit-level knowledge sharing) on unit-level unit performance at low and high levels of unit-level absorptive capacity (AC)

importance of knowledge sharing and applying technical knowledge (Chen *et al.*, 2014) to assist better performance. Such technology-oriented firms will cultivate the higher level of absorptive capacity to facilitate the identification of new and highly product opportunities. Unit with high absorptive capacity have embedded routines in tasks, tools, processes, and people to analyze and absorb external knowledge to meet market needs (Chen *et al.*, 2014). Unit absorptive capacity can also assist decrease the coordination costs through unit social integration mechanisms. Such social mechanism is vital element of unit absorptive capacity because they foster unit knowledge sharing (Vega-Jurado *et al.*, 2008). By extending prior studies (e.g. Closs *et al.*, 2008), we found that not only firm-level absorptive capacity but also unit-level absorptive capacity assist control of the flow of information by increased specialization within units and more efficient coordination among units. Such knowledge acquisition, assimilation, transfer, and exploitation methods can also have intense effect between transformational leaders and knowledge sharing across organizational levels.

Third, the finding of moderating effect of unit-level absorptive capacity and between unit-level knowledge sharing and unit performance. This findings further extends the understanding of cross-level studies on the TFL and follower's performance in that lower organizational level of TFL used by top managers tend to rely on higher organizational level of contextual variables to foster lower level of performance outcomes at the unit level. This implies that a unit with higher level of performance activities has a main focus on garnering a high level of capacity to acquire, assimilate, transform, and exploit to promote the positive effect of knowledge sharing and sequent performance. This finding also echoing prior studies (e.g. Andersson *et al.*, 2014; Mathieu and Chen, 2011) in that the cross-level interaction effects advances the knowledge of higher level of leaders could implement transformational leaders to promote lower level of performance outcomes under the influence of a upgrading unit-wide absorptive capacity. Consistent with prior studies, emerging economies' firms such as Taiwan lack of resources to support new product development and generate better unit performance, leaders have to focus to upgrade unit absorptive capacity to acquire, assimilate, transform, and exploit external knowledge for the commercial ends. This finding further supports the moderating effect of unit-level absorptive capacity and unit new product performance as well as overall performance (e.g. Chang *et al.*, 2012).

Theoretical implications

Overall, three conclusions emerge. First, although previous research on TFL has suggested that transformational leaders are capable of influencing knowledge sharing (e.g. Crossan *et al.*, 1999; Shamir *et al.*, 1993), few attempts have been made to examine this effect. Our findings show that transformational leaders at the firm level are capable of influencing unit-level performance by promoting effective knowledge sharing at the unit level. That is, when firm-level leaders demonstrate TFL behaviors toward their unit subordinates, the unit subordinates are more likely to share ideas and knowledge at the unit level and are more likely to generate innovative ideas in solving unit challenges. This in turn improves performance. To our knowledge, this study is one of the first attempts to use unit-level knowledge sharing as a mediating mechanism to explain the performance of TFLs and their subordinates across levels. As such, our findings contribute to the leadership literature by putting in substantive mediator to explain how the effects of TFL influence all levels of a firm (Colquitt and Zapata-Phelan, 2007; Whetten, 1989). Identifying such multilevel effects of TFL deepens our understanding of TFL performance beyond just TFL and employee-performance relationships. Our research also supports the foundation of the TFL theory, which proposes that TFL is particularly useful for different levels of organizations facing challenges (Bass *et al.*, 2003).

Second, this study makes efforts to address the calls of previous scholars (e.g. Shamir and Howell, 1999; Kark and Shamir, 2002) to investigate the relationships between TFL and the performance of subordinates within a multilevel model. In particular, our results indicate that firm-level TFL can explicate the unique variations of employee performance at the unit level through different mediating mechanisms such as unit-level knowledge sharing. This complements existing literature showing the direct effects of TFL on performance (Chi and Huang, 2014), and responds to the calls for investigation into the mediating variables of different work environments and lower levels within organizations (Braun *et al.*, 2013).

Third, although TFL studies have suggested that a more complete theoretical model should consider the boundary conditions in which the theory is assumed to unfold (Dubin, 1976), the boundary effects of unit-level absorptive capacity remain underexplored in TFL research (Jansen *et al.*, 2009). The results of our study expand the TFL theory by explicitly adding unit-level absorptive capacity as a moderator across levels, and investigating its boundary influence regarding a mediating model (Chuang *et al.*, 2012).

In arriving at the third conclusion, we utilized time-lagged objective unit-level performances and collected survey data from multiple and multilevel sources. Because we used Taiwanese firms to illustrate the TFL effects and the performance of subordinates at the lower level of the organizational hierarchy, we addressed the call for more leadership studies to be conducted in Asia (Lam *et al.*, 2012) while also emphasizing the effectiveness of the theory of TFL in an emerging Asian economy.

Practical implications

The findings of this study have several practical implications. First, organizations should develop effective training modules to train their top leaders at the firm level in TFL. This would not only result in better performance at lower levels of organizational ladders, but would also assist organizations in identifying those managers with leadership qualities as potential candidates for TFL training (Judge and Bono, 2000). Moreover, human resource departments should set up TFL training courses that include role modeling and mentoring techniques to develop managers. This would allow top managers at the firm level to extend their reach and influence, through TFL (Barling *et al.*, 1996).

Second, the results showing the mediating effect of unit-level knowledge sharing between firm-level TFL and unit-level performance indicates that the training courses designed by HR departments should not only focus on top leaders at the firm level, but also encourage the unit members to share knowledge at the unit level.

Third, identifying the moderating role of unit-level absorptive capacity highlights the importance of unit members' ability to acquire, transform, process, and utilize external knowledge. Developing this capacity would ensure continuous knowledge sharing and thus improve unit-level performance. Some HR practices such as job rotation have been found to be useful in improving unit members' absorptive capacity (Jansen *et al.*, 2005). Organizations may also consider offering unit members skill development training courses to help them understand how to obtain and process new external knowledge for commercial use.

Limitations and future directions

There are several limitations which require further research. First, although our study sample of Taiwanese firms is valuable in promoting the TFL theory, the findings of our study also have limitations in terms of generalizability. Future research can expand our model to similar cultural settings, such as China. Second, the mechanisms between performance at the firm level and lower levels such as units and groups are worth future

investigation. Scholars can attempt to explore the mediating variables of other knowledge transfer variables such as knowledge acquisition, knowledge received, or knowledge integration. Through further exploring the underlying blackbox between TFL and performance linkage, the legitimacy of the findings in existing TFL research can be improved (Braun *et al.*, 2013).

Third, this study did not investigate other types of moderation mechanisms across different levels such as firm-level cultural context, firm-level top management dynamics, or unit-level learning capacity, which might moderate the effects of TFL on performance across different levels. It is possible that firm-level top management dynamics or unit-level learning capacity might influence unit-level performance differently.

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