

Article

Transformational Leadership in Japanese R&D Teams: Team Efficacy, Norm for Maintaining a Consensus, Communication, and Team Performance

Jun Ishikawa*, Xu Yijing**

Abstract

This study examined the influence of transformational leadership on team performance in a study of 636 researchers working in 131 R&D industrial research teams in Japan. Potential effects of team efficacy, norm for maintaining a consensus, and communication were also studied as possible mediating influences on the leadership—performance relationship. Results indicate that transformational leadership was not directly related to independently rated team performance because it had both positive and negative effects through mediators. Transformational leadership is the key to promoting team efficacy, norm for maintaining a consensus, intra-team communication, and internal communication. Among the possible mediators, team efficacy, intra-team communication, and internal communication were positively related to team performance, while the norm for maintaining a consensus was negatively related to it. Results are discussed in the context of the unique Japanese work environment as well as in the larger context of leadership processes across different regions and cultures.

Keywords: transformational leadership, team efficacy, norm for maintaining a consensus, communication, R&D team performance

I Introduction

Research and development (R&D) performance is one of the key ways by which Japanese companies maintain an international competitive advantage. Many studies have attempted to determine the factors affecting the performance of Japanese

R&D processes (Clark and Fujimoto, 1991; Nonaka and Takeuchi, 1995). However, few studies have dealt with leadership in Japanese R&D settings, although leadership is one of the most important factors that influence team performance.

There are many studies on leadership in R&D settings around the world. Some researchers have directed their attention toward transformational leadership in particular. According to Elkins and Keller (2003), transformational leadership can be effective in R&D settings. Their principal finding is that transformational leaders can often create conditions in R&D labs that, as in other work environments, are conducive to exceptional team effort and creativity. This, in turn, can lead to enhanced group performance.

Indeed, some previous studies showed that transformational leadership had a positive impact on team efficacy (Jung and Sosik, 2002; Walumbwa, Peng, Lawler, and Kan, 2004). Team efficacy is a shared belief team members have about the ability of the team to achieve its goals (Bandura, 1977). It is positively related to a high level of team performance because it influences the aspirations that members have for their team, and their level of effort (Gully, Joshi, Incalcaterra, and Beaubien, 2002). Transformational leadership may therefore positively influence R&D team performance through team efficacy. However, there is no empirical evidence for this notion even in Western R&D settings.

Elkins and Keller (2003) also suggested that the effects of transformational leadership depended on the context. Moreover, a study by the GLOBE re-

* Professor of Management, College of Business, Rikkyo University

** PhD Candidate, College of Business, Rikkyo University

search project suggests that such leadership can be effective in some cultural environments (Dickson, Den Hartog, and Castano, 2009; House, Hanges, Javidan, Dorfman, and Gupta, 2004), but certainly not in all environments especially in a collectivist culture like Japan's.

Because group values and cognitive frameworks in a collectivist culture are different from those found in an individualist culture, effective teamwork and leadership styles in a collectivist culture may differ. House et al. (2004) identified Japan as a country where the effectiveness of Western-style leadership may be limited. In particular, a strong consensus norm could negatively affect R&D team performance by curbing unique ideas that run counter to prevailing beliefs (Ishikawa, 2008). If House et al. (2004) is correct, the effect of such norms on transformational leadership should be examined in Japan. Previous studies have neglected this effect because it is not significant in Western settings. It may, however, be significant in a collectivist culture like Japan's.

In addition, previous studies of transformational leadership have also overlooked the effect on communication on work teams. In general, communication is a key factor affecting team performance and tends to be more important in R&D settings than in other settings. Several studies have found that variations in the patterns of communication can affect R&D team performance (Allen, 1977; Hirst and Mann, 2004; Katz and Tushman, 1979; Kivimaki and Lansisalmi, 2000). Moreover, Ishikawa (2007) found that there were significant effects from the variations in such patterns on R&D team performance in Japanese companies. Despite these findings, however, few studies have examined the relationship between transformational leadership and team communication in R&D settings.

The aim of this study is to further explore this relationship by examining the effects of transformational leadership on independently measured R&D team performance, as they may be influenced by variations in team efficacy, norm for maintaining a consensus, and communication patterns. By investigating leadership within the Japanese cultural context, this study will illuminate the role of leadership

in overriding the country's collectivist culture.

II Theoretical background and hypotheses

1 Transformational leadership in R&D settings

Transformational leadership has been defined as a leadership behavior that influences followers by broadening and elevating their goals and by providing them with the confidence to perform beyond the expectations specified in the implicit or explicit exchange agreement (Dvir, Eden, Avolio, and Shamir, 2002). According to transformational leadership theory, much of the previous literature on leadership was premised on followers' rational decision-making—followers behave in ways that maximize their rewards within the organization, which requires leaders to integrate those rewards with their goals. Therefore, it is important for leaders to set goals, clarify desired outcomes, provide feedback, and exchange rewards for accomplishments (Dvir et al., 2002).

In reality, however, followers do not necessarily behave rationally. Particularly in high-performance teams, followers prioritize their contributions to team performance over their rational exchange agreement. In transformational leadership theory, transformational leadership, which promotes followers' motivation to contribute to team performance at the cost of the rational exchange agreement, is distinguished from transactional leadership, which is based purely on a rational exchange agreement between leaders and their followers.

According to Bass and Avolio (1990), transformational leadership comprises four dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. Idealized influence is a leadership behavior that inspires followers and fosters identification with their leader. Inspirational motivation encourages followers through the expression of lofty values or visions. Intellectual stimulation includes drawing followers' attention to problems and promoting novel perspectives and intellectual curiosity. Individualized consideration involves realizing followers' needs and providing them with support and coaching. All of

these behaviors encourage followers' contributions to the achievement of their team's goals.

Transformational leadership has been extensively studied by leadership researchers in recent years, and many empirical studies have demonstrated its relationship to attitudes on the job (Barling, Weber, and Kelloway, 1996; Dumdum, Fielden, and Hill, 1991; Podsakoff, MacKenzie, Moorman, and Fetter, 1990) and the job performance of followers (Barling et al., 1996; e.g., Dumdum et al., 1991; Dvir et al., 2002; Howell and Avolio, 1993; Lowe and Galen Kroeck, 1996; Yammarino and Dubinsky, 1994). Some of these studies were conducted in R&D settings.

Berson and Linton (2005) compared the effects of transformational leadership in R&D settings with those in non-R&D settings. Although a significant correlation between transformational leadership and outcome variables, including quality level, job satisfaction, and overall satisfaction, was observed in both R&D and non-R&D settings; the correlation was even stronger in R&D settings.

Keller (1992) discovered that transformational leadership was positively related to R&D team performance, which included project quality and budget/schedule rated by project members and managers, respectively. The author notes that transformational leadership significantly influenced project quality and budget/schedule in both research and development teams, although the significance of the correlation was more prominent in research projects than in development projects. Keller (2006) also pointed out, based on a longitudinal study, that transformational leadership could predict profitability five years ahead and speed to market. Although the positive relationship between transformational leadership and R&D team performance was empirically verified by Keller (1992, 2006), any mediators between them were not identified.

Shin and Zhou (2003) found that intrinsic motivation mediated the relationship between transformational leadership and followers' creativity in Korean R&D settings, and that followers' conservation, which was one of the values, moderated the relationship between them. The authors noted that followers' conservation largely affected the efficiency of transformational leadership in Korean cultural

circumstances. Since Shin and Zhou (2003) analyzed their data on the individual level, it should be noted that the variable, which mediated the relationship between transformational leadership and creativity, was no more than individual-level constructs.

Thus, these studies indicate that transformational leadership was positively related to R&D team performance in the samples studied. Still, the question remains: what are the possible group-level mediators of this relationship? We examine three possibilities: team efficacy, the norm for maintaining a consensus, and communication.

2 Team efficacy

Srivastava, Bartol, and Locke (2006) and Walumbwa et al. (2004) focused on team efficacy as a mediator between leadership and team performance. According to Bandura (2000), team efficacy can influence the aspirations that the members have for their team, their effort levels, the way they approach tasks, and their persistence under adverse conditions—overall team performance. Using meta-analysis, Gully et al. (2002) examined 67 empirical studies that investigated the relationship between team efficacy and team performance. Results of Gully et al. (2002) indicated that team efficacy was positively related to team performance, although interdependence moderated the relationship between them.

Team efficacy is especially important for R&D teams. In general, members of highly effective teams are committed to their tasks and tend to have cognitive flexibility (McGraw and Fiala, 1982). To be creative in the R&D process, team members need to think beyond traditional ways. Thus, it is important that each member recognizes phenomenon through various cognitive frameworks. Furthermore, the members who are part of teams with a high level of team efficacy need to master various problem-solving skills (Harter, 1978). Team members must master a number of skills before they become part of a team, because it is uncertain what kind of skills will be needed to achieve goals in the R&D process. Indeed, Pelz and Andrews (1966) noted that mastering a number of skills has a posi-

tive impact on R&D performance. Moreover, those who are part of teams with a high level of team efficacy are better able to tolerate ambiguous situations (Gibbons, 1998). The R&D process is highly volatile, which can be stressful for team members. Having a high degree of tolerance for uncertainty and ambiguity can help a team achieve a high level of performance. We can conclude, therefore, that team efficacy may be one of the most important variables mediating the correlation between leadership and R&D team performance.

It should also be noted that the abovementioned four dimensions of transformational leadership can promote team efficacy in R&D teams. Idealized influence connects followers' individual identities to their team's missions (Kark and Shamir, 2002). Inspirational motivation helps followers commit to achieving those missions. Team members who identify with and commit to a team's research goal will see that goal as having value, and thus will be intrinsically motivated to pursue the goal, because they will believe that the likelihood of achieving the goal is high.

Individual consideration involves providing support, encouragement, and coaching to followers. This dimension promotes the development of team members' ability (Dvir et al., 2002). If team members recognize that the research ability of each of them will increase, they will be convinced of the fact that research ability as the team will also increase. Finally, intellectual stimulation encourages followers to implement new ways of addressing problems. New ideas are created from new ways of doing things. Team members will draw stimulation from teams whose leaders are encouraging and innovative.

Walumbwa et al. (2004) empirically showed that transformational leadership was related to team efficacy in Chinese and Indian financial companies. Although the authors' survey samples did not include R&D teams, it is possible to conclude from their work that transformational leadership could also enhance team efficacy in R&D teams.

Hypothesis 1: Team efficacy mediates the relationship between transformational leadership and R&D team performance in such a way that

transformational leadership is positively related to team efficacy, and team efficacy is positively related to R&D team performance.

3 Norm for maintaining a consensus

As mentioned above, previous studies have illuminated how transformational leadership positively influences R&D team performance in Western settings. Nevertheless, it is possible that transformational leadership also has a negative impact on R&D team performance through its effect on norm for maintaining a consensus in Japanese settings.

Japan has a collectivist and high-context culture in which group consensus is highly valued (Dulek and Fielden, 1991). Management practices are designed to promote this even in R&D divisions of companies. Unlike in Britain, Germany, or the United States, most Japanese R&D employees are recruited right out of college and tend to devote themselves to a single company until retirement. Moreover, company-specific knowledge and skills are highly valued, and in-house training is regarded as being very important (McCormick, 1995). Because of this, intellectual "inbreeding" and radical innovations may fail to emerge at the rate that is often found in the West.

It is possible that transformational leadership serves to reinforce group consensus, which in turn reinforces either the status quo or merely marginal or evolutionary change or innovation. One reason for this effect is that transformational leadership has a strong impact on its followers—team members will simply not refute their leaders' opinions. In addition, idealized influence encourages followers to identify with their leader. The effect is very similar to that of charismatic leadership, which encourages personal identification with a leader, as followers try to both please and imitate their leaders (Conger, 1989). Under such an influence, followers do not want to criticize their leaders and will not permit colleagues to criticize them either. After a review of previous studies, Yukl (2002) noted that "Being in awe of the leader reduces good suggestions by followers," and "Desiring for leader acceptance inhibits criticism by followers" as being the drawback of charismatic leadership.

Other studies have indicated that transformational leadership promotes team cohesiveness (Jung and Sosik, 2002; Pillai and Williams, 2004) because it fosters followers' commitment to the goal and encourages them to work with other team members to achieve that goal. In general, therefore, cohesiveness has a positive impact on team performance. Nonetheless, too much cohesiveness can also have a negative impact on team performance, because it represses dissenting opinions. Leana (1985) showed that group cohesiveness was one of the causes of groupthink. Thus, transformational leadership may suppress opinions expressed by the minority.

In addition, transformational leadership unites followers and creates a climate conducive to achieving goals (Liao and Chuang, 2007). Transformational leadership may pressure followers not to act against the climate the leader wants to create. Under such pressure, it is difficult for followers to behave independently or to freely criticize other ideas or team members.

As a result, team members may be reluctant to diverge from such norms; indeed, they may be punished for it. While similar norms are found in the West, the strength of a consensual culture in Japan makes it much more difficult for employees to take issue with dominant ideas, usually preventing them from opposing any consensus reached in the group or organization to which they belong. As a result, many new ideas that do not receive immediate group approval can languish or die. For example, Postmes, Spears, and Cihangir (2001) found that strong pressure to maintain consensus adversely affected the quality of group decision making, and leads to poor team performance. At the same time, such norms often reduced the diversity of information and opinions within a team, which is essential for R&D performance (Allen, 1977; Pelz and Andrews, 1966). It can therefore be posited that the importance of consensus in Japanese culture undermines a diversity of new ideas and can hinder R&D team performance in Japanese companies.

Hypothesis 2: Norm for maintaining a consensus mediates the relationship between transformational leadership and R&D team performance

in such a way that transformational leadership is positively related to norm for maintaining a consensus and this is negatively related to R&D team performance.

4 Communication

New knowledge creation is the final goal of R&D activity. New knowledge is created through the composition of existing information. R&D team members must therefore obtain various kinds of information to create a solid base for new knowledge creation.

Two kinds of information are needed to achieve R&D goals. The first is technological information. To create technological knowledge, various kinds of technological information, including the latest information, are required. While team members can acquire this information through books and articles, they also need to make extensive use of specialists outside their organizations (Allen, 1977; Farris, 1972).

The second kind of information covers the manufacturing process and the needs of customers. Team members usually acquire such information through internal communication, i.e., communication with employees in other departments within the organization. In addition to obtaining information, team members are also required to share and exchange information amongst themselves. Information sharing is vital for cooperation, which promotes goal achievement among members.

It is also possible that new knowledge is created through the information exchange process among team members. For sharing and exchanging information, intra-team communication must be facilitated. Thus, building on the findings of previous research (e.g., Hirst and Mann, 2004; Kahn, 1996; Katz and Tushman, 1979; Kivimaki and Lansisalmi, 2000; Utterback, 1971), we would expect that the ample availability of external, internal, and intra-team communication would be positively related to R&D team performance.

Transformational leadership likely has a positive impact on team communication. Inspirational motivation is a behavior that communicates an appealing vision and uses symbols to concentrate the ef-

forts of followers. Such behavior clarifies their goals (Nemanich and Keller, 2007) and promotes commitment to the goal (Piccolo and Colquitt, 2006). Team members therefore clearly understand what information is necessary. Further, a high level of commitment to the goal stimulates members' information-seeking activities, because information is one of the most important resources for the achievement of R&D goals. Furthermore, if the team's goal is clarified, it becomes easy to understand what kind of information needs to be shared and exchanged within the team.

As noted above, transformational leadership has a positive impact on the development of followers (Dvir et al., 2002), because individualized consideration provides followers with support and coaching. The development of followers includes both advancing their communication skills and inducement for communication, since communication is a key factor in R&D performance. Under this positive influence of transformational leadership, team members actively communicate internally, externally, and within the team.

Intellectual stimulation allows followers to come up with and expound novel perspectives, and be intellectually curious. Through this process, they can apply new ideas or try new methods. As a result, team members will begin to communicate in a more positive, focused way, and use communication as an important tool for obtaining new ideas or methods. In the process of this kind of exchange, new ideas and methods will be created.

Ideal influence contributes to followers looking beyond their own self-interest, thus overcoming fear of incurring costs on performing communication. Moreover, as team members internalize the importance of the team's missions, they will work toward the achievement of those missions, specifically, in this case, communication that contributes to the acquisition of information from outside of the team and to the exchange of information within the team.

Madzar (2001) found that transformational leadership was positively related to the information-inquiry behaviors of its followers. However, as noted above, the exchange of information is also required

to achieve R&D goals. Thus, it is clear that transformational leadership helps to promote internal, external, and intra-team communications of team members.

Hypothesis 3a: Internal communication mediates the relationship between transformational leadership and R&D team performance in such a way that transformational leadership is positively related to internal communication, and internal communication is positively related to R&D team performance.

Hypothesis 3b: External communication mediates the relationship between transformational leadership and R&D team performance in such a way that transformational leadership is positively related to external communication, and external communication is positively related to R&D team performance.

Hypothesis 3c: Intra-team communication mediates the relationship between transformational leadership and R&D team performance in such a way that transformational leadership is positively related to external communication, and external communication is positively related to R&D team performance.

III Methodology

1 The sample

Our sample consisted of 131 R&D teams from eight industrial parts manufacturers in Japan. In addition to 131 team leaders (response rate = 100%), 636 (out of 734) R&D team members (response rate = 86.6%) and 32 managers (response rate = 100%) also participated in the study¹. Each team member belonged to a single team, and each team was managed by one of the 32 managers. Among the team leaders, 93.9% were men, 9.2% held a doctoral degree, and their average age was 36.7 years. Among the team members, 89.0% were men, their average age was 30.1 years, and their average tenure in the team was 2.0 years. The average team size was 5.6 persons.

2 Measures

This study consisted of six questionnaire measures and control variables. Corresponding Japanese versions for all of the measures used in this study were constructed in accordance with the translation-back-translation procedure outlined by Brislin (1980).

Transformational leadership was measured using 20 items adapted from Bass's multifactor leadership questionnaire (MLQ) form 5X-short (Bass and Avolio, 2004). Each team member was asked to rate his/her leader's behavior on a five-point response scale. Four items were used to measure inspirational motivation, intellectual stimulation, and individualized consideration. Eight items were used to measure idealized influence. To verify that these four factors contributed to an overall transformational leadership index, a confirmatory factor analysis was conducted. The result of the analysis suggested that a higher-order factor solution provided an adequate fit ($\chi^2 = 131.27$ ($p < 0.05$), AGFI = 0.91, CFI = 0.94, RMSEA = 0.04, NFI = 0.93).

Team efficacy was measured using five items adapted from Riggs and Warka (1994). An example of the items used in this scale is "The team I work with has above-average ability." Each team member was asked to rate his/her team efficacy on a five-point response scale.

Intra-team communication was measured by one item, and *internal and external communication* was measured by three items each. Each team member was asked to rate the frequency of intra-team, internal, and external communication in his/her team on a five-point response scale, ranging from strongly agree to strongly disagree on a five-point response scale.

Norm for maintaining a consensus was measured by three items adapted from Postmes et al. (2001). Each team member was asked to rate his/her group norm for maintaining consensus on a five-point response scale, ranging from very strong to very weak. For example, one of the three measuring items was "People in this group generally adjust to one another with ease."

A confirmatory factor analysis was conducted to

investigate whether transformational leadership, team efficacy, the effect of maintaining consensus, intra-team communication, internal communication, and external communication were the distinct construct in each category, respectively. The result of our analysis suggested that a six-factor solution fit better than did other solutions.

Team performance was measured independently by the following four items adapted from Keller (2001): technical quality, schedule performance, cost performance, and overall team performance. The managers, who are higher in rank than team leaders, were asked to rate each item on a five-point response scale.

Control variables include team size, which was provided by the leaders, and team members' average tenure, which was provided by the team members.

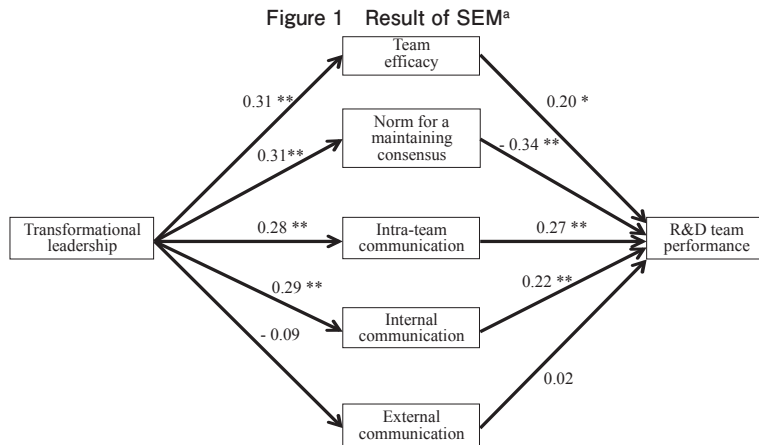
3 Aggregation Tests

Transformational leadership, team efficacy, the norm for maintaining a consensus, intra-team communication, internal communication, and external communication were aggregated to mean values within each team, the unit of the analysis. To justify this aggregation, a within-group correlation (r_{wg}) was computed to assess the amount of agreement by the team members (James, Demaree, and Wolf, 1984). The mean $r_{wg(j)}$ value was 0.87 for transformational leadership, 0.89 for team efficacy, 0.89 for norm for maintaining a consensus, 0.86 for internal communication, and 0.85 for external communication, and $r_{wg(I)}$ value was 0.90 for intra-team communication. In addition, the ICC(1) values were as follows: transformational leadership, 0.22; team efficacy, 0.49; norm for maintaining a consensus, 0.25; intra-team communication, 0.32; internal communication, 0.24; and external communication, 0.36. ICC(2) values were as follows: transformational leadership, 0.61; team efficacy, 0.82; norm for maintaining a consensus, 0.65; intra-team communication, 0.69; internal communication, 0.64; external communication, 0.76. The overall pattern of results across the r_{wg} , ICC(1), and ICC(2) analyses provided sufficient support for aggregating the data to a team level of analysis.

Table 1 Discriptive

	Mean	s.d.	α	1
1. Team size	5.60	1.01		
2. Team tenure: Member	1.99	1.00		0.02
3. Transformational leadership	3.24	0.62	0.93	0.02
4. Team efficacy	3.12	0.77	0.81	0.12
5. Norm for maintaining a consensus	2.85	0.79	0.81	-0.16
6. Intra-team communication	3.72	0.76		-0.15
7. Internal communication	3.25	0.54	0.80	-0.04
8. External communication	2.50	0.86	0.84	-0.09
9. Team performance	3.01	0.96	0.84	-0.08

* $p < 0.05$, ** $p < 0.01$.



** $p < 0.01$, * $p < 0.05$.

^a The effect of control variables are not shown.

IV Results

The mean values, standard deviations, and coefficient α , as well as a correlation matrix, are shown in Table 1. As expected, transformational leadership had significant positive correlations with team efficacy, norm for maintaining a consensus, intra-team communication, and internal communication. Further, team efficacy, intra-team and internal communication had significant positive correlations with team performance, and norm for maintaining a consensus had significant negative correlation with team performance. However, external communication was not related to either transformational leadership or team performance. Moreover, and perhaps most importantly, transformational leadership

did not have a significant correlation with team performance in this sample.

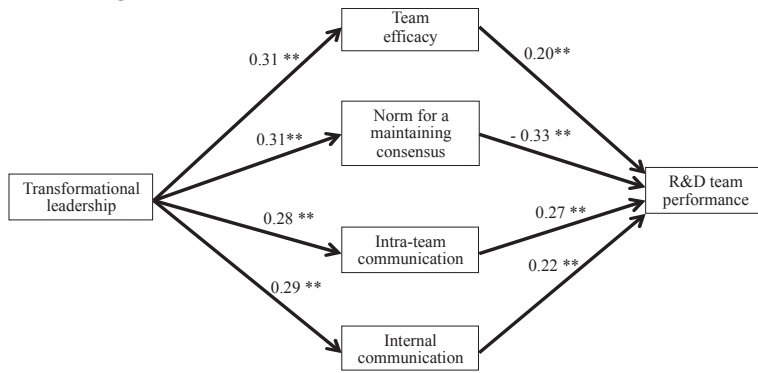
To test the relationship among transformational leadership, various potential mediators, and R&D team performance, structural equation modeling was conducted; the results are shown in Figure 1.

Transformational leadership was positively related to team efficacy, norm for maintaining a consensus, intra-team communication, and internal communication, but was not significantly related to external communication. On the other hand, norm for maintaining a consensus had a negative correlation with team performance and team efficacy, and intra-team communication and internal communication had a positive correlation with team performance. External communication had no significant correlation with team performance. These results suggest that external communication does not me-

Statistics and Correlations

	2	3	4	5	6	7	8
	0.04						
	0.10	0.31**					
	0.19*	0.31**	-0.09				
	0.32	0.29**	0.15	0.12			
	0.18*	0.29**	0.12	-0.03	0.12		
	-0.21*	-0.10	0.18*	0.12	0.06	0.11	
	0.12	0.11	0.28**	-0.29**	0.31**	0.29**	0.05

Figure 2 Result of SEM^b Excluded External Communication



** $p < 0.01$.

^b The effect of control variables are not shown.

diate between transformational leadership and team performance. Moreover, this model did not show adequate fit ($\chi^2 = 43.25$ ($p < 0.05$), AGFI = 0.83, CFI = 0.80, RMSEA = 0.13, NFI = 0.76).

Thus, another model, which excluded external communication, was examined. The results of this model are shown in Figure 2. There is therefore an adequate fit ($\chi^2 = 11.77$ ($p > 0.05$), AGFI = 0.92, CFI = 0.99, RMSEA = 0.04, NFI = 0.92), in which all paths were significant. A negative correlation was found only between norm for maintaining a consensus and team performance, while the other correlations were all positive. The result of this analysis suggests that norm for maintaining a consensus mediates the relationship between transformational leadership and team performance in such a way that transformational leadership is positively related to the effect of norm, and the effect of norm was

negatively related to team performance. On the other hand, team efficacy, intra-team communication, and internal communication positively mediated the relationship between transformational leadership and R&D team performance.

Although Figure 2 suggests an indirect relationship between transformational leadership and team performance, it is possible that there is a direct relationship between them. Therefore, a partially mediated model, which was obtained by adding a direct path between transformational leadership and team performance, was conducted. The result of this analysis showed an adequate fit ($\chi^2 = 11.74$ ($p > 0.05$), AGFI = 0.91, CFI = 0.98, RMSEA = 0.05, NFI = 0.92), but the correlation between transformational leadership and team performance was not significant.

These results thus support Hypothesis 1, 2, 3a,

and 3b, but not Hypothesis 3c.

V Discussion

In this study, the relationship between transformational leadership and R&D team performance in Japanese companies was examined. The results indicated that transformational leadership had two kinds of effects on R&D team performance: a positive effect on performance through team efficacy, intra-team communication, and internal communication, and a negative effect on performance through norm for maintaining a consensus. Transformational leadership was positively related to all of these mediators. However, norm for maintaining a consensus was negatively related to team performance, although other mediators were positively related to team performance. Accordingly, the correlation between transformational leadership and R&D team performance was not significant in this sample.

As with most studies, this study is not exempt from certain limitations. The first limitation is that this is not an actual comparative study. Other studies conducted in Western settings were reviewed to note the differences in findings on the effects of transformational leadership. However, comparative study is necessary for making clear the difference between Western settings and non-Western settings.

A second potential limitation is that this study focuses on R&D teams. While a better understanding of leadership processes in such teams is clearly useful, it is not certain that employees and teams in other Japanese organizations or professions would respond in a similar manner. In view of the largely collectivist nature of Japanese society, it is unlikely that many people in different work environments would indeed respond in a similar way. This is an empirical issue that the present study does not address.

Third, research and development were not examined separately. Previous study indicated that the difference between research and development could be an important moderator in terms of the

correlation between transformational leadership and R&D team performance (Keller, 1992). Although many of the teams that participated in this study engaged in development research, their companies did not differentiate research divisions from development divisions. A study that distinguishes between the two departments will be of great interest.

Despite these limitations, this study makes two contributions to the theory of leadership. First, it highlights the dysfunction inherent in transformational leadership. Most studies have showed how transformational leadership has a positive effect on performance irrespective of the situation. In particular, a few studies have indicated that transformational leadership might have a negative effect on performance, depending on the cultural context. However, this study verifies that transformational leadership negatively affect R&D team performance because of norm for maintaining a consensus in Japanese culture. This indicates that the effects of transformational leadership are quite different in non-Western cultures, particularly in collectivistic cultures like Japan's.

Second, this study focused on communication as the mediator between transformational leadership and team performance. Many studies have indicated that communication has a significant impact on R&D performance. Some studies have also shown that transformational leadership is effective in R&D settings. No study, however, has examined the relationship between transformational leadership, communication, and R&D team performance. This oversight may be the largest defect in the leadership research conducted so far in R&D settings. This study definitely demonstrated this relationship. Although transformational leadership had a negative impact on R&D team performance, it also had a positive impact on intra-team and internal communication, and on team efficacy.

Because the effectiveness of leadership often depends on the cultural context, leaders must display leadership styles that are in harmony with the cultural context in which they find themselves; however, even that approach is just the beginning for leaders of the future. The diversity of team mem-

bers will dramatically increase, even in R&D teams. Leaders will have to deal with many kinds of followers. They will therefore need to display leadership that is flexible and adaptable.

In this study, it was shown that norm for maintaining a consensus had a significant effect on the relationship between leadership and performance. This suggests that there are some factors that are embedded in culture and thus directly influence the effectiveness of leadership. It is required to find such cultural factors by comparative studies in future.

In Japanese companies, ambiguous and highly contextual behaviors such as “*nemawashi*” exist for the purpose of, for instance, acquiring resources and removing obstacles. Leaders could have influence over their subordinates by using informal human networks or by making their team members somehow “owe” them something for a substantial period of time. Thus, R&D team leaders should act in a way that helps optimize team performance. This type of leadership may also be effective in Western companies, although to a different degree. If such leadership is induced to explicit construct, it will contribute to research in Western setting. In short, it is possible that in non-Western settings there are some tacit constructs that are worth studying for future leadership. These are the gems we will need to unearth in the future.

Note

1 The questionnaires were distributed and collected on company premises and with prior approval of the R&D department management of each firm. Because of this, the response rate was high. In addition, the questionnaires were collected by the author after being enclosed in envelopes and sealed. Therefore, confidentiality was maintained.

References

- Allen, T. J. (1977), *Managing the Flow of Technology*, Cambridge: MIT Press.
- Bandura, A. (1997), *Self-efficacy: The Exercise of Control*, New York: Freeman.
- Bandura, A. (2000), “Exercise of Human Agency through Collective Efficacy,” *Current Directions in Psychological Science*, 9(3): 75-78.
- Barling, J., T. Weber and E. K. Kelloway (1996), “Effects of Transformational Leadership Training on Attitudinal and Financial Outcomes: A Field Experiment,” *Journal of Applied Psychology*, 81(6): 827-832.
- Bass, B. M. and B. J. Avolio (1990), “Developing Transformational Leadership: 1992 and Beyond,” *Journal of European Industrial Training*, 14(5): 21-27.
- Bass, B. M. and B. J. Avolio (2004), *Multifactor Leadership Questionnaire — Form 5X - Short*, 3rd. ed., Menlo Park: Mind Garden.
- Berson, Y. and J. D. Linton (2005), “An Examination of the Relationships between Leadership Style, Quality, and Employee Satisfaction in R&D versus Administrative Environments,” *R&D Management*, 35(1): 51-60.
- Brislin, R. W. (1980), “Translation and Content Analysis of Oral and Written Materials,” in H. C. Triandis and W. W. Lambert, eds., *Handbook of Cross-cultural Psychology*, Vol. 2: 389-444, Boston: Allyn & Bacon.
- Clark, K. B. and T. Fujimoto (1991), *Product Development Performance: Strategy, Organization, and Management in the World Auto Industry*, Boston: Harvard Business School Press.
- Conger, J. A. (1989), *The Charismatic Leader: Behind the Mystique of Exceptional Leadership*, San Francisco: Jossey-Bass.
- Dickson, M., D. Den Hartog and N. Castano (2009), “Understanding Leadership Across Cultures,” in R. S. Bhagat and R. M. Steers, eds., *Cambridge Handbook of Culture, Organizations, and Work*, 219-243, Cambridge: Cambridge University Press.
- Dulek, R. E., J. S. Fielden and J. S. Hill (1991), “International Communication: An Executive Primer,” *Business Horizons*, 34(1): 20-25.
- Dumdum, U. R., K. B. Lowe and B. J. Avolio (1991), “International Communicating: An Executive Primer”, in B. J. Avolio and F. J. Yammarino, eds., *Transformational and Charismatic Leadership: The Road Ahead*, Vol. 2: 36-66, Oxford: Elsevier Science.
- Dvir, T., D. Eden, B. J. Avolio and B. Shamir (2002), “Impact of Transformational Leadership on Follower Development and Performance: A Field Experiment,” *Academy of Management Journal*, 45(4): 735-744.
- Elkins, T. and R. T. Keller (2003), “Leadership in Research and Development Organizations: A Literature Review and Conceptual Framework,” *Leadership Quarterly*, 14(4/5): 587-606.
- Farris, G. (1972), “The Effect of Individual Roles on Performance in Innovative Groups,” *R&D Management*, 3(1): 23-28.
- Gibbons, R. (1998), “Incentive in Organization,” *Journal of*

- Economic Perspectives*, 12(4): 115–132.
- Gully, S. M., A. Joshi, K. A. Incalcaterra and J. M. Beaubien (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(5): 819–832.
- Harter, S. (1978), "Effectance Motivation Reconsidered: Toward a Development Model," *Human Development*, 21(1): 34–64.
- Hirst, G. and L. Mann (2004), "A Model of R&D Leadership and Team Communication: The Relationship with Project Performance," *R&D Management*, 34(2): 147–160.
- House, R., P. Hanges, M. Javidan, P. Dorfman and V. Gupta (2004), *Culture, Leadership, and Organizations*, Los Angeles: Sage.
- Howell, J. M. and B. J. Avolio (1993), "Transformational Leadership, Transactional Leadership, Locus of Control, and Support for Innovation: Key Predictors of Consolidated-Business-Unit Performance," *Journal of Applied Psychology*, 78(6): 891–902.
- Ishikawa, J. (2007), "Leadership to Improve Performance of R&D Project Teams," Asia Academy of Management Professional Development Workshop in Academy of Management Annual Meeting, Philadelphia, PA.
- Ishikawa, J. (2008), "Transformational Leadership and R&D Team Performance in Japanese Companies: Focusing on Negative Effects of Transformational Leadership," Paper presented at the Asia Academy of Management Annual Conference, Taipei, Taiwan.
- James, L. R., R. G. Demaree and G. Wolf (1984), "Estimating Within-group Interrater Reliability with and without Response Bias," *Journal of Applied Psychology*, 69(1): 85–98.
- Jung, D. I. and J. J. Sosik (2002), "Transformational Leadership in Work Groups: The Role of Empowerment, Cohesiveness, and Collective-Efficacy on Perceived Group Performance," *Small Group Research*, 33(3): 313–336.
- Kahn, K. B. (1996), "Interdepartmental Integration: A Definition with Implications for Product Development Performance," *Journal of Product Innovation Management*, 13(2): 137–151.
- Kark, R. and B. Shamir (2002), "The Dual Effect of Transformational Leadership: Priming Relational and Collective Selves and Further Effects on Followers," in B. J. Avolio and F. J. Yammarino, eds., *Transformational and Charismatic Leadership: The Road Ahead*, Vol. 2: 67–91, Oxford: Elsevier Science.
- Katz, R. and M. Tushman (1979), "Communication Patterns, Project Performance, and Task Characteristics: An Empirical Evaluation and Integration in an R&D Setting," *Organizational Behavior & Human Performance*, 23(2): 139–162.
- Keller, R. T. (1992), "Transformational Leadership and the Performance of Research and Development Project Groups," *Journal of Management*, 18(3): 489–501.
- Keller, R. T. (2001), "Cross-functional Project Group in Research and New Product Development: Diversity, Communications, Job Stress, and Outcomes," *Academy of Management Journal*, 44(3): 547–555.
- Keller, R. T. (2006), "Transformational Leadership, Initiating Structure, and Substitutes for Leadership: A Longitudinal Study of Research and Development Project Team Performance," *Journal of Applied Psychology*, 91(1): 202–210.
- Kivimaki, M., H. Lansisalmi, M. Elovainio, A. Heikkila, K. Lindstrom, R. Harisalo, K. Sipila and L. Puolimatka (2000), "Communication as a Determinant of Organizational Innovation," *R&D Management*, 30(1): 33–42.
- Leana, C. R. (1985), "A Partial Test of Janis' Groupthink Model: Effects of Group Cohesiveness and Leader Behavior on Defective Decision Making," *Journal of Management*, 11(1): 5–17.
- Liao, H. and A. Chuang (2007), "Transforming Service Employees and Climate: A Multilevel, Multisource Examination of Transformational Leadership in Building Long-term Service Relationships," *Journal of Applied Psychology*, 92(4): 1006–1019.
- Lowe, K. B., K. Galen Kroeck and N. Sivasubramaniam (1996), "Effectiveness Correlates of Transformational and Transactional Leadership: A Meta-analytic Review of the MLQ Literature," *Leadership Quarterly*, 7(3): 385–425.
- Madzar, S. (2001), "Subordinates' Information Inquiry: Exploring the Effect of Perceived Leadership Style and Individual Differences," *Journal of Occupational & Organizational Psychology*, 74(2): 221–232.
- McCormick, K. (1995), "Career Paths, Skill Formation, and Technological Obsolescence," in P. Shapira, ed., *The R&D Workers: Managing Innovation in Britain, Germany, Japan, and the United States*, 59–78. Westport: Quorum Books.
- McGraw, K. O. and J. Fiala (1982), "Undermining the Zeigarnik Effect: Another Hidden Cost of Reward," *Journal of Personality*, 50(1): 58–66.
- Nemanich, L. A. and R. T. Keller (2007), "Transformational Leadership in an Acquisition: A Field Study of Employees," *Leadership Quarterly*, 18(1): 49–68.
- Nonaka, I. and H. Takeuchi (1995), *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, New York: Oxford University Press.
- Pelz, D. C. and F. M. Andrews (1966), *Scientists in Organizations: Productive Climates for Research and Development*, New York: John Wiley & Sons.
- Piccolo, R. F. and J. A. Colquitt (2006), "Transformational Leadership and Job Behaviors: The Mediating Role of Core Job Characteristics," *Academy of Management Jour-*

- nal*, 49(2): 327-340.
- Pillai, R. and E. A. Williams (2004), "Transformational Leadership, Self-efficacy, Group Cohesiveness, Commitment, and Performance," *Journal of Organizational Change Management*, 17(2): 144-159.
- Podsakoff, P. M., S. B. MacKenzie, R. H. Moorman and R. Fetter (1990), "Transformational Leader Behaviors and Their Effects on Followers' Trust in Leader, Satisfaction, and Organizational Citizenship Behaviors," *Leadership Quarterly*, 1(2): 107-142.
- Postmes, T., R. Spears and S. Cihangir (2001), "Quality of Decision Making and Group Norms," *Journal of Personality & Social Psychology*, 80(6): 918-930.
- Riggs, M. L., J. Warka, B. Babasa, R. Betancourt and S. Hooker (1994), "Development and Validation of Self-efficacy and Outcome Expectancy Scales for Job-related Applications," *Educational & Psychological Measurement*, 54(3): 793-802.
- Shin, S. J. and J. Zhou (2003), "Transformational Leadership, Conservation, and Creativity: Evidence from Korea," *Academy of Management Journal*, 46(6): 703-714.
- Srivastava, A., K. M. Bartol and E. A. Locke (2006), "Empowering Leadership in Management Teams: Effects on Knowledge Sharing, Efficacy, and Performance," *Academy of Management Journal*, 49(6): 1239-1251.
- Utterback, J. M. (1971), "The Process of Technological Innovation within the Firm," *Academy of Management Journal*, 14(1): 75-88.
- Walumbwa, F. O., W. Peng, J. J. Lawler and S. Kan (2004), "The Role of Collective Efficacy in the Relations between Transformational Leadership and Work Outcomes," *Journal of Occupational & Organizational Psychology*, 77(4): 515-530.
- Yammarino, F. J. and A. J. Dubinsky (1994), "Transformational Leadership Theory: Using Levels of Analysis to Determine Boundary Conditions," *Personnel Psychology*, 47(4): 787-811.
- Yukl, G. (2002), *Leadership in Organizations*, 5th ed., Upper Saddle River: Prentice-Hall.