

Relationships among project manager's leadership style, team interaction and project performance in the Taiwanese server industry

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Abstract The purpose of this study was to investigate the relationships of the project manager's leadership style with team interaction, and their impact on project performance. The second objective was to determine whether the effect of leadership style on project performance may be mediated by team interaction. To address the primary aims, a questionnaire-based survey was used to measure the project manager's leadership style, team communication and collaboration, and overall performance of research and development (R&D) projects in the Taiwanese server industry. The analyses suggest that transformational leadership may be positively related to team communication and collaboration. Additionally, levels of team communication and collaboration are positively associated with projects' levels of performance. The results also indicate that team communication and collaboration may serve as mediators between transformational leadership and project performance.

Keywords Transactional leadership · Transformational leadership ·
Team communication · Team collaboration · Project performance

1 Introduction

In order to respond rapidly to market needs and increase profits, companies must shorten product development and reduce time-to-market for new products. Product development

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projects have received substantial attention in the industry as they help the companies in achieving important business goals. Hyväri (2006) stated that many companies use project management techniques to attain certain predetermined objectives. Since more and more companies become project-based organizations, the field of project management is quickly expanding.

In the highly competitive information industry, the best companies are constantly searching for proven practices that offer a competitive advantage. These companies generally avoid practices that do not provide some proven added value. Several studies have shown that the role of a project manager is critical to project success. Green (2005) pointed out that a star project leader is good at managing relationships across organizational functions and boundaries to break through organization inertia and bureaucracy. Sauer (1993) suggested that non-technical factors such as management, organization, and culture are associated with project success. Lewis (1993) contended that people issues are absolutely critical to project success. However, the literature on project success factors has largely ignored the impact of a project manager and his or her leadership style on project success (Turner and Muller 2005). Even though some practices have been adopted and others abandoned, however, no empirical study has been done on the associations between project leadership style and team interaction. In addition, there has been no comprehensive industry-wide study on the impacts of team interaction on project outcomes. This lack of information regarding leadership benefits along with uncertain competitive advantage from team interaction has resulted in a manager's reluctance to adopt different leadership styles.

Some project managers develop particular leadership behaviors in the attempt to achieve the goals of a project. These project managers are also examining team interaction for ways to improve project success. However, since the benefits of leadership behaviors can be rather intangible, this has slowed or prevented the implementation of leadership theories. Accordingly the impact of leadership behaviors on project performance has been one of the major issues for both industry and academic fields. In order to understand the benefits, there is a need for quantification of the benefits derived from leadership behaviors. Research on leadership behaviors and its associations with project performance should offer tangible evidence of advantages from adopting a certain leadership style.

While many studies have promoted leadership as a means to enhance team performance, very few published empirical studies have explored the effects of various leadership styles on overall project performance. In addition, none of the previous research attempts to determine whether the effect of leadership style on project performance may be mediated by team interaction. Empirical evidence that supports the links between leadership styles, team interaction, and project performance is lacking. Thus, developing such support will illustrate the benefits of leadership. In summary, there is a need for more comprehensive empirical evidence that evaluates the benefits associated with the project manager's leadership style and, more specifically, its impact on team interaction and project performance.

This study attempts to fill this void of empirical evidence by identifying the associations between leadership style, team interaction, and project performance. The purpose of this research is three-fold. The first objective of this study was to investigate the relationships between the project manager's leadership style and team interaction. The second objective was to study the impacts of team interaction on overall project performance. The third objective was to determine whether team interaction plays a mediating role in the relationship between leadership style and project performance. The analyses of the project manager's leadership style and relationships with team interaction and project performance are based on an industry-wide survey performed between March 2007 and April 2007. A data collection tool was developed to assess the project manager's leadership style, levels of team

interaction, and the performance of R&D projects in the Taiwanese server industry. The data analyzed in this study are project-specific, meaning the data are representative of the levels of interaction (including communication and collaboration) within project teams.

2 Literature review and research hypotheses

A considerable body of research conducted on leadership stresses the importance of leadership style. Six schools of leadership have evolved over the past several decades. The visionary school discovered two types of leadership, transactional and transformational leadership. Bass and Avolio (1990) identified different components of the two types of leadership. However, transactional leadership is often contrasted with transformational leadership. Transactional leadership emphasizes contingent rewards. The transactional leader rewards subordinates for meeting performance objectives. As such, the transactional leadership style presents traditional views on leadership, which focuses on the contractual agreement between the leader and the subordinate on expected performance in return for certain rewards (Thite 2001). Furthermore, the leader-follower relationship is reduced to the simple exchange of a certain quality of work for an adequate price (Wang et al. 2005). The leaders take action when assignments are not proceeding as planned. Previous research indicated that the cost-benefit exchange process would only result in ordinary outcomes.

Unlike the transactional leaders who indicate how current needs of subordinates can be satisfied, transformational leaders show charisma and create pride, respect, trust, and a vision. Transformational leadership provides inspiration and intellectual stimulation, motivates followers by creating high expectations and modeling appropriate behaviors, and challenges follows with new ideas and approaches (Bass 1990). Transformational leaders pay attention to the concerns of individual team members. Bass (1985) contended that today's environment requires that subordinates perform beyond ordinary expectations and that is deliverable by transformational leadership. Leaders with a transformational style are seen as more effective by subordinates and superiors (Fiol et al. 1999; Lowe et al. 1996). Keller (1992) found that transformational leadership may be a predictor of project performance in R&D organizations. Keegan and Den Hartog (2004) forecasted that transformational leadership would be more suitable for project managers but found no significant link. Furthermore, some research investigated the interaction of the project manager's leadership style with project type. Müller and Turner (2007) concluded that different leadership styles are appropriate for different types of projects. Higgs and Dulewicz (2004) found a preference for transformational leadership style on complex change projects and a preference for transactional leadership style on simple projects. Additionally, Frame (1987) and Turner (1999) suggested that different leadership styles are appropriate at different phases of the project life cycle. In summary, the literature suggested that transactional and transformational leadership styles may be effective styles for project managers.

The above studies provided valuable knowledge regarding leadership behaviors. In addition to the literature on leadership style, some focused on discussion of the team interaction such as team communication and collaboration. Communication is a process for disseminating information to other team members (Lussier 2003). Team communication can be thought of as the extent to which members exchange thoughts and opinions with others to complete the mission (Campion et al. 1993). Solomom (2001) indicated that communication is playing a critical role in team operations. On the other hand, collaboration is also critical to group environment. Collaboration consists of working together with one or more others, especially in a joint intellectual effort. Collaboration can improve relationships between team members

(Nelson and Coopridner 1996). Additionally, effective team performance may derive from successful collaboration between team members (Jassawalla and Sashittal 1999; Kotlarsky and Oshri 2005). In summary, prior studies indicated that team interaction is playing an important enabling role in team performance (Trist 1981).

While the above authors investigated the behaviors of leaders and team members, other researchers have also been active in exploring the impacts of the manager's leadership on the performance of organizations and companies. Prior studies indicated a correlation between the manager's leadership style and successful performance in business. While the relationships between leadership behaviors and performance in business have received substantial attention, the number of studies dealing with the leadership style of the project manager and its contribution to project success is rather scarce. Morris (1988) found that poor leadership is a failure factor during formation, build-up, and close-out phases. Kendra and Taplin (2004) cited that the leadership and personal characteristics of the project managers are associated with project success factors. However, many of the previous studies asked project managers their opinion, and it would seem that many project managers do not recognize themselves or their leadership style as a contributor to project success (Turner and Muller 2005). In summary, a large body of literature has attempted to identify project success factors. However, prior studies have ignored the project managers or their leadership styles as project success factors.

A review of the literature suggests that the adoption of leadership style as a means to enhance team interaction has been supported. Earlier studies supported the notion that adopting transactional and transformational leadership styles is beneficial. As indicated by the review of literature, leader's behaviors may be positively related to team communication and collaboration (Zaccaro et al. 2001; Wang et al. 2005; Bass 1990). Based on leadership theory and the previous research, the following research hypothesis was developed:

H1 The project manager's leadership styles (including transactional and transformational leadership styles) are positively correlated to team interaction (including team collaboration and communication).

The relationships between team interaction and team performance have also been studied. The results of previous studies indicated a correlation between team interaction and team performance. Communication and collaboration have also been identified as factors influencing team performance. As such, team communication and collaboration may result in uniformity of team members, and makes the team more effective. In previous research, team communication and collaboration was found to be associated with a critical determinant of team performance (Kotlarsky and Oshri 2005; Thamain 2004). This study extends previous research by addressing the impacts of team communication and collaboration on overall project performance. Based on the relevant literature, the following hypothesis was postulated and tested:

H2 Team interaction (including team collaboration and communication) is positively correlated to overall project performance.

There has been some work conducted on the associations between the project manager's leadership and the behaviors of team members. The impact of the project manager's leadership style on team interaction has been recognized by previous studies. The literature suggested that a manager's behaviors are viewed as the strongest predictors of team communication and collaboration. Additionally, above prior studies indicated that team interaction is playing important enabling roles in team performance. Teams can be made more successful

by improving their interaction. As such, effective team performance may derive from team collaboration and communication (Morris 1988; Kendra and Taplin 2004). Finally, many researchers have argued that team interaction may play a mediating role in the relationship between leadership style and team performance (Gladstein 1984; Kahai et al. 1997). Based on team leadership theory and the empirical research on leadership style, particularly in relation with behaviors of team members and team performance, the following hypotheses are proposed:

H3 Team interaction (including team collaboration and communication) may act as a mediator between leadership styles (including transactional and transformational leadership styles) and overall project performance.

This study adds to the literature in two valuable ways. First, it provides evidence of performance implications of the project manager's leadership styles and team interaction. Second, it offers important results on the identification of mediating roles of team interaction in the relationship between leadership style and overall project performance.

3 Methodology

3.1 Data collection tool

A survey instrument was used to measure the project manager's leadership style, team interaction, and performance on R&D projects in the Taiwanese server industry. The data collection tool was developed based on variables used in previous studies. The survey was composed of four sections: (1) the project manager's leadership style, (2) team interaction, (3) project performance, and (4) personal information. The first section assesses aspects of the project manager's leadership style, including transactional leadership and transformational leadership. The second section of the survey measures level of team interaction on the subject project. Team interaction is measured by team communication and collaboration. The third section evaluates overall project performance. The fourth section obtains information concerning the respondent and the project. Study participants were first asked to identify a recent project that they were familiar with for assessment. For the subject project, the survey then asks participants to assess the project manager's leadership style, team interaction, and final performance for that project.

3.2 Sample selection and data collection

This research employed a mail survey methodology for data collection. The sample for this study focuses on Taiwanese manufacturers of computer server. The sample of manufactures was selected from the list of firms with large shipping quantity between first quarter 2005 and third quarter 2006, published by Market Intelligence Center of Institute for Information Industry in Taiwan. The survey questionnaire was sent to 300 employees of server manufacturers in Taiwan on March 19, 2007. Some of the companies were then contacted via phone or email to identify the manager or the person involving in R&D projects by name and title. Reminders were sent by e-mail or phone after survey mailing. Finally, after the initial mailing a second mailing of the survey was made to non-respondents. A reminder letter, too, followed the second mailing. Of the 300 questionnaires sent, 202 were returned. The overall response rate was 67.33%. Among the returned surveys, 6 were discarded since they

Table 1 Respondents' profile

Characteristics	Categories	Number of respondents	Percentage of respondents
Title	Manager/Deputy manager	17	8.7
	Assistant manager	1	0.5
	Director	24	12.2
	Engineer	150	76.5
	Other	4	2.0
Age	More than 45	2	1.0
	41–45	5	2.6
	36–40	31	15.8
	31–35	73	37.2
	26–30	80	40.8
	Less than 26	5	2.6
Education	Master's degree	64	32.7
	Bachelor's degree	109	55.6
	Associate's degree	23	11.7
Number of team member	More than 45	32	16.3
	31–45	16	8.2
	16–30	60	30.6
	Less than 16	88	44.9

contained too many missing values. In addition, the responses were examined to ensure that no duplicate project information was collected. Ultimately, 196 survey responses were used in the analysis.

The sample consisted of managers/deputy managers ($n = 17$), assistant manager ($n = 1$), directors ($n = 24$), engineers ($n = 150$), and others ($n = 4$). With respect to age, 3.6% of the respondents are more than 40, 15.8% are between 36 and 40, 37.2% are between 31 and 35, and the remaining 43.4 are less than 31. Furthermore, 32.7% of the respondents indicated that they held a master's degree, while another 55.6% held a bachelor's degree. The remaining 11.7% held an associate's degree. Regarding the number of members in each participating project, 16.3% are more than 45, 38.8% are between 16 and 45, and the remaining 44.9% are less than 16 (see Table 1).

3.3 Measurement

The project manager's leadership style assessed includes transactional and transformational leadership. The items used to measure transactional leadership were based on the questionnaires developed by Bass and Avolio (1990), Thite (2001) and Wang (2001). On the other hand, the scales developed by Podsakoff et al. (1990) were adapted to evaluate transformational leadership. A six-point response scale was used (from 1 = never to 6 = always) to measure the frequency of the transactional and transformational behaviors.

Two subscales (team communication and team collaboration) were used to measure team interaction. Items used to rate team interaction were based on the questionnaires developed

by Tjosvold (1988) and Campion et al. (1993). Responses are given on 6-point scale, from 1 (strongly disagree) to 6 (strongly agree).

Questions from Keller (1994), Pinto and Slevin (1988) and Larson and Gobeli (1988) were adapted to measure overall project performance. Three subscales (schedule performance, cost performance, and quality performance) were used to evaluate overall project performance. Each item was rated on a 6-point scale, where 1 represented strongly disagree and 6 represented strongly agree.

3.4 Dealing with reliability and validity

Cronbach's coefficient (α) was computed to test the reliability and internal consistency of the responses. Reliability was assessed for transactional leadership at 0.929, transformational leadership at 0.914, team communication at 0.926, team collaboration at 0.908, and project performance at 0.907. The values of Cronbach's α above 0.7 are considered acceptable and those above 0.8 are considered meritorious (Nunnally 1978; Carmines and Zeller 1979; Litwin 1995). All of the α values for constructs are above 0.8, indicating a high degree of internal consistency in the responses.

Additionally, two main types of validity, content and construct validity, were tested. The content validity of the survey used in this study was tested through a literature review and interviews with practitioners. In other words, the survey items were based on previous studies and discussions with these executives. The refined assessment items were included in the final survey. The construct validity was tested by factor analysis. Factors were extracted using varimax rotation. As suggested by Hair et al. (1995), an item is considered to load on a given factor if the factor loading from the rotated factor pattern is 0.50 or more for that factor. The factor loadings for the items used in the study are at least 0.595. Thus, no items were dropped due to low factor loadings.

4 Results and analysis

4.1 Constructs of leadership style, team interaction, and project performance

Factor analysis with varimax rotation was used to decide the grouping of leadership style constructs. Only variables with a factor loading greater than 0.5 were extracted (Hair et al. 1995). The ten items of leadership style constructs are classified into two factors. They are transactional leadership and transformational leadership. All of the factor loadings range from 0.723 to 0.916, indicating a high level of internal consistency among the leadership style items. Similarly, factor analysis was also employed to group 12 items of team interaction constructs. The two constructs categorized are team communication and team collaboration. The factor loadings range from 0.595 to 0.851. Additionally, only one factor was found to underlie project performance. The analysis shows factor loadings ranging from 0.765 to 0.828.

4.2 Correlation analysis

Leadership style was considered along the two dimensions: transactional leadership and transformational leadership. Team interaction was measured by team communication and team collaboration. Each dimension is composed of several questionnaire items that measure its various aspects. The first part of data analysis consists of examining the correlations

Table 2 Correlation between leadership style, team interaction, and project performance

Variables	Leadership style	Team interaction	Project performance
Leadership style	1.000		
Team interaction	0.399**	1.000	
Project performance	0.317**	0.483**	1.000

** Significant at the 0.01 level

Table 3 Regression results for leadership style and team interaction

Independent variables	Team communication	Team collaboration
Transactional leadership	0.143 ^a	0 ^a
Transformational leadership	0.321 ^{a,***}	0.360 ^{a,***}
<i>R</i> -squared	0.179	0.130
<i>F</i> -statistic	21.065 ^{***}	14.428 ^{***}

^a The number denotes the beta coefficient for the particular variable

*** Significant at the 0.001 level

between the composite measure of leadership style, the composite measure of team interaction, and the single measure of project performance. The results of the correlation analysis are presented in Table 2. The results from the analysis suggest that all the three measures (project manager’s leadership style, team interaction, and project performance) are highly correlated.

4.3 Impacts of leadership style on team interaction

Regression analyses were applied in order to learn about the extent to which the two team interaction dimensions (i.e. team communication and team collaboration) were influenced by the two leadership style practices (i.e. transactional and transformational leadership). Table 3 presents the regression results for the variables that could impact team communication and team collaboration. Based on the *F*-statistic, each of the two regression analyses is statistically significant at the .001 level. One of the two leadership style variables, transformational leadership, exhibits statistical significance for team communication. The significant variable has a positive coefficient. As such, the findings suggest that increases in levels of transformational leadership may improve team communication. Furthermore, transformational leadership also exhibits statistical significance for team collaboration. More specifically, the results indicate that transformational leadership should have positive influences on team collaboration. The data do not show statistically significant results for transactional leadership.

4.4 Impacts of team interaction on project performance

Table 4 presents the regression results for the two constructs (i.e. team communication and team collaboration) that could impact project performance. The regression results for project performance indicate that the two constructs exhibit statistically significant influence on project performance. Team communication is statistically significant at the .05 level, while team collaboration is statistically significant at the .001 level. Team communication and collaboration was found to be positively related to project performance, suggesting that project success can be achieved with stronger team communication as well as greater team collaboration.

Table 4 Regression results for team interaction and project performance

Independent variables	Project performance
Team communication	0.200 ^{a,*}
Team collaboration	0.317 ^{a,***}
<i>R</i> -squared	0.234
<i>F</i> -statistic	29.495 ^{***}

^a The number denotes the beta coefficient for the particular variable

* Significant at the 0.05 level; *** significant at the 0.001 level

4.5 Mediators between leadership style and project performance

The general test for mediation is to examine the relation between the independent and the dependent variables, the relation between the independent and the mediator variables, and the relation between the mediator and dependent variables. All of these correlations should be significant. The relation between predictor and criterion should be reduced after controlling the relation between the mediator and criterion variables (Baron and Kenny 1986). In this study, formal mediation testing was subsequently conducted to determine whether individual team interaction dimensions (i.e. team communication and team collaboration) mediate the relationships between leadership style and project performance. The mediating roles of individual team interaction dimensions in the relationships between transactional leadership and project performance and between transformational leadership and project performance were examined by investigating changes in beta coefficients and *R*-squared when entering individual team interaction variables in a series of regression models. In the relationship between transformational leadership and project performance, the first three conditions for mediation specified by Baron and Kenny (1986) were met by team interaction dimensions. Thus, each team interaction variable (i.e. team communication and team collaboration) was subsequently tested to determine if it fulfilled the fourth condition for mediation. The analysis assessed the effect of including each team interaction variable in hierarchical linear regressions where transformational leadership was the independent variable and project performance was the dependent variable. However, in investigating the relationship between transactional leadership and project performance, the first three conditions for mediation specified by Baron and Kenny (1986) were not satisfied.

Multiple regression models were developed with transformational leadership, team communication, and project performance in order to measure the mediating role of team communication in the relationship between transformational leadership and project performance. While project performance is the dependent variable, transformational leadership was entered on the first step (Model 1) and team communication was entered on the second step (Model 2). As such, transformational leadership is the only independent variable in Model 1. The second model introduced one more independent variable (i.e. team communication) into the equation. Table 5 presents summary of Hierarchical Regression Analysis. The first model (i.e. transformational leadership) explained 12.8% of the variance in project performance ($F = 28.386, p < .001$). The results indicate that higher levels of transformational leadership are associated with higher levels of project performance. Model 2 (i.e. transformational leadership and team communication) explained 22.7% of the variance in project performance ($F = 28.282, p < .001$). Both of transformational leadership and team communication are significant variables, indicating that a higher level of transformational leadership and a greater

Table 5 Regression analysis for Models 1, 2, and 3

Independent variables	Project performance		
	Model 1	Model 2	Model 3
Transformational leadership	0.357 ^{a,*}	0.217 ^{a,***}	0.218 ^{a,***}
Team communication	–	0.345 ^{a,***}	–
Team collaboration			0.368 ^{a,***}
<i>R</i> -squared	0.128	0.227	0.257
<i>F</i> -statistic	28.386 ^{***}	28.282 ^{***}	33.376 ^{***}

^a The number denotes the beta coefficient for the particular variable

* Significant at the 0.05 level; *** significant at the 0.001 level

team communication are associated with a higher level of project performance. In other words, an index of team communication was added in the second model and this explained an additional 9.9% of the variance. Additionally, with the addition of team communication, standardized regression coefficients (β) for transformational leadership decreased (from .357 to .217). In summary, subsequent testing for the fourth condition of mediation shows that the inclusion of team communication yields significant reductions in the beta-coefficients for transformational leadership. Although the transformational leadership index continued to be a significant explanatory variable, its contribution was reduced. This is supportive of a mediatory role for team communication.

On the other hand, multiple regression models (Models 1 and 3) were developed with transformational leadership, team collaboration, and project performance in order to assess the mediating role of team collaboration in the relationship between transformational leadership and project performance. While project performance is the dependent variable, the first model includes one independent variable (i.e., transformational leadership) in the equation and the third model introduced one more independent variable (i.e. team collaboration) into the equation. As shown in Table 5, Model 1 explained 12.8% of the variance ($F = 28.386$, $p < .001$) and Model 3 explained 25.7% of the total variance in project performance scores ($F = 33.376$, $p < .001$). In this analysis, transformational leadership variable accounted for 12.8% of the variance in project performance while team collaboration explained an additional 12.9% of the variance. Both of transformational leadership and team collaboration in Model 3 are significant variables, indicating that a higher level of transformational leadership and a greater team collaboration are associated with a higher level of project performance. With the introduction of team communication, the beta coefficient for transformational leadership remained significant but decreased by 39% (from 0.357 to 0.218). In other words, subsequent testing for the fourth condition of mediation shows that the inclusion of team collaboration yields significant reductions in the beta-coefficients for transformational leadership. This suggests that team collaboration may partially mediate the relationship between transformational leadership and project performance.

5 Conclusions and recommendations

Some project managers develop particular leadership behaviors in the attempt to improve the performance of a project. However, the lack of information regarding uncertain competitive advantage from leadership behaviors results in a manager's reluctance to adopt

different leadership styles. Since the benefits of leadership behaviors can be rather intangible, this has slowed or prevented the implementation of leadership theories. While research has centered on the benefits derived from the behaviors of leadership, relatively less has approached the impacts of leadership style on team communication and collaboration. There is also little work with quantifiable information on how team interaction affects overall project performance. Additionally, few articles are known about whether team interaction mediates the relationship between leadership style and project performance. Thus, a study of the relationships between leadership behaviors, team interaction, and project success is necessary.

The purpose of this study was to determine the associations between the project manager's leadership style and team interaction and the impacts of team communication and collaboration on project performance. The other objective was to determine whether team interaction may act as a mediator between leadership style and project performance. These analyses show that transformational leadership is positively associated with team communication. This indicates that the project managers who adopt transformational leadership may improve team communication. These analyses also indicate a strong correlation between transformational leadership and team collaboration, suggesting that high levels of transformational leadership should have positive influences on team collaboration. However, the study found no significant link between transactional leadership and team interaction. In investigating the relationship between team interaction and project performance, team communication and team collaboration is positively related to project performance. The findings suggest that project success can be achieved with stronger team communication as well as greater team collaboration.

Formal mediation testing was subsequently conducted to determine whether individual team interaction dimensions (i.e. team communication and team collaboration) mediate the relationships between leadership style and project performance. The mediating roles of individual team interaction dimensions in the relationships between transactional leadership and project performance and between transformational leadership and project performance were examined. The test results suggest that team communication variable may partially mediate the relationship between transformational leadership and project performance. The analysis also supports a mediating role for team collaboration.

The research provides empirical evidence that supports the expectation of gaining significant benefits with adoption of a particular leadership style. This paper reports on the findings of empirical research and provides recommendations for improving team communication, team collaboration, and project performance. Findings from this study are helpful to project managers in deciding whether to adopt certain leadership style on projects. One limitation of this study is its cross-sectional design. An objective for future study is to determine how the associations are changing over time. Survey with a longitudinal design may be needed to gain deeper insights into the nature and mediating roles of the relationships. Furthermore, the sample for this study focuses on R&D projects in the server industry. Consideration should be given to investigate the associations in other industries. This could also lead to greater insights into the associations between leadership behaviors and project success. Additionally, it would be worthwhile to analyze projects according to different data class variables (such as project size and project type) in further exploring the associations. The potential effects of team members on the project manager's leadership style also need to be considered in further research. Finally, the impacts of leadership behaviors on specific performance areas (rather than overall project performance) should be evaluated in future research.

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