Chapter 38
Empowering Leadership in R&D Teams: A Closer Look at the Process and Outcomes

Yu-Qian Zhu and Houn-Gee Chen

Abstract Recent research suggests that there are two distinct behavioral components of leadership: (1) those targeted at influencing the group as a whole (group-focused); and (2) those aimed at individual group members (individual-focused). Differentiated individual-focused leadership occurs when leader exhibits varying levels of individual-focused leadership behavior across different group members. This research examines the unique influences of group-focused empowering leadership and differentiated individual-focused empowering leadership on R&D team's processes and team effectiveness.

Keywords Empowering leadership · R&D teams · Group-focused leadership · Individual focused leadership · Differentiated leadership

38.1 Introduction

Recent research points out that leaders can attend to both team and individual members [1, 2]. Thus, there are two distinct behavioral components of leadership: (1) those targeted at influencing the group as a whole (e.g., setting goals for the whole group, and provide inspiration for the whole group); and (2) those aimed at individual group members (e.g., setting goals for individual members, and providing individualized coaching). The former is called group-focused leadership, while the latter is termed individual-focused leadership [2]. Differentiated individual-focused leadership occurs when leader exhibits varying levels of

Y.-Q. Zhu (✉) · H.-G. Chen
National Taiwan University, Taipei City, Taiwan
e-mail: yuqian@gmail.com

H.-G. Chen
e-mail: hgchen@ntu.edu.tw

L. Uden et al. (eds.), *The 8th International Conference on Knowledge Management in Organizations*, Springer Proceedings in Complexity,
DOI: 10.1007/978-94-007-7287-8_38,

individual-focused leadership behavior across different group members, for example, treating some members better than others; or providing more support to some members than others [2]. A critique question concerning differentiated leadership is whether it is beneficial or detrimental to team effectiveness. Wu et al. [2] reported that differentiated individual-focused transformational leadership harms group effectiveness through self-efficacy divergence. However, much is still left unexplored. For example, what are the effects of differentiated individual focused empowering leadership on other team outcomes, such as performance and creativity, and through what mechanism?

The introduction of group-focused, individual-focused, and differentiated leadership addresses "the dynamic interplay between the individuals within a team and the team as a whole" [1], and provides a unique lens to examine leadership behavior and new insights for the leadership literature [2]. To advance this line of research, the current research aims to investigate empowering leadership in R&D teams through the lens of group-focused and differentiated individual focused leadership, and the mechanism through which they affect team effectiveness in the forms of team creativity and performance. We examine how group-focused and differentiated individual focused leadership influence team creativity and performance through internal team processes, i.e. intra-team competition and collaboration. We contribute to existing literature in two ways. First, we add to the empowering leadership literature by examining the behavior components and characteristics of empowering leadership: group-focused, and differentiated individual focused leadership. Instead of treating empowering leadership as an overall concept, we look into the components of empowering leadership, and explore each component's unique contribution/effects to team effectiveness. Thus, we're able to provide more targeted and fine-tuned advices to R&D managers regarding their management concerns. Second, this research extends our understanding of how R&D team leaders influence team creativity and performance through creativity-enabling or hindering group processes. We investigate how leadership behaviors, although unintended, may lead to unwanted group processes as an outcome.

38.2 Theory and Hypotheses

Based on the heuristic model of team effectiveness, we propose empowering leadership behavior as the contextual factor in our model. An empowering leader consults with and makes joint decisions with team members and delegates responsibilities to team members, encourages team members' active participation and self-leadership, and encourages followers to actively provide input, participate in team decisions, and display initiative [3]. Extending prior work by Pearce and Sims [4], Faraj and Sambamurthy [3] defined empowering leadership in the R&D context to consist of three dimensions: encouraging teamwork, encouraging self-development, and participative goal setting. These three dimensions can be then categorized into two types: group-focused empowering leadership, and

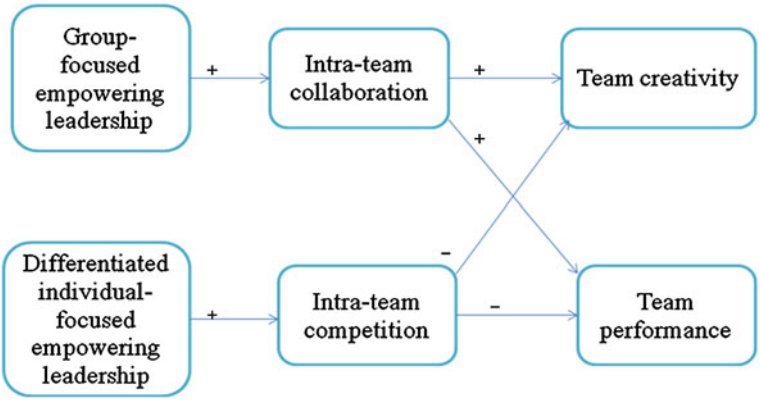

Fig. 38.1 Proposed research model

differentiated individual-focused empowering leadership. Group-focused empowering leadership refers to activities that are aimed at influencing the team as a whole. For example, encouraging teamwork and providing vision for the whole team. Differentiated individual-focused empowering leadership, however, describes leader treating members differently in individual-focused activities such as providing resources/support, and encouraging individual learning. The contextual factor of empowering leadership induces team processes, defined as the interaction pattern among team members [5]. In this research, we focus on two specific forms of team processes: intra-team competition and collaboration. These processes, accordingly, lead to different team outcomes, such as team creativity and performance. Figure 38.1 below delineates the proposed research model.

Specifically, this model links group-focused empowering leadership with intra-team collaboration, as it forms an environment conducive to collaboration. On the other hand, differentiated individual-focused empowering leadership involves within-team variability of member experiences with leadership, and may hurt team outcomes by igniting intra-team competition. Below we explicate the logic underlying our arguments.

38.2.1 Group-Focused Empowering Leadership

Group-focused leadership sets its influence target as a whole group, rather than individual members within the group. For the team as a group, leaders can direct the team as a whole and influence team outcomes by leadership activities such as setting shared team goals and providing team rules and guidance. Empowering leadership focuses on member participation and self-management [6], and encouraging teamwork is an important aspect of empowering leadership as closer teamwork enhances the ability of a team's self-management [4]. Encouraging

teamwork, as one dimension of empowering leadership is likely to influence a team as a whole because of its emphasis on common ground, shared values, and ideology. Empowering leaders encourage teamwork by urging the whole team to work together as a team and coordinate efforts with each other [4]. Thus, in this study, we refer to encouraging team work as group-focused empowering leadership.

Theory of Reasoned Action suggests that subjective norms and attitudes can influence one's behavioral intentions, and subsequently, the actual behavior [7], the need for social connection and intimacy, is one of the three core psychological need of human being [8]. Collaboration with other team members can provide fulfillment of the need of relatedness. Therefore, it is likely that people have initial positive attitudes toward collaboration. Moreover, as group-focused empowering leadership emphasizes the importance of the team to work together as an entity and coordinate efforts with each other, team members likely embrace teamwork as a subjective norm, i.e. a perceived expectations to perform what is expected from relevant individuals or groups [7]. For group-focused empowering leadership that promotes team members working together as a team, team members are likely to form positive interaction with each other and collaborate with each other to achieve common team goals. Drawing on the above reasoning, we predict:

Hypothesis 1 Group-focused empowering leadership is positively related to intra-team collaboration.

38.2.2 Differentiated Individual-Focused Empowering Leadership

Differentiated individual-focused empowering leadership describes leader treating members differently in individual-focused activities such as providing resources/support, and encouraging individual learning. Individual-focused leadership has its roots in situational leadership theories, which suggest that effective leaders should vary their behavior on the basis of follower's individual characteristics (i.e., capabilities) as well as contextual factors [2]. For the three dimensions of R&D empowering leadership proposed by Faraj and Sambamurthy [3], encouraging self-development and participative goal setting appear to focus more on individuals needs and capabilities. Self-development refers to leadership behaviors that encourage team members to learn new things, develop new skills, and seek new opportunities, while participative goal setting emphasizes leader and individual member setting performance goals together [3]. Thus, these two dimensions are considered individual-focused empowering leadership.

Differentiated individual-focused empowering leadership, however, captures the variation of individual-focused leadership among team members [2]. A high level of differentiated leadership signifies that the leader treat different members differently. For example, instead of treating all members as the same, the leader

may encourage some members to seek new opportunities to grow more often than other members. Or, the leader may sit with some members and discuss their performance goals with them, but give directive orders to others as far as performance goals are concerned. Low levels of differentiated leadership, on the contrary, suggest that the leader provides similar level of participation and support for development for each team member.

Prior research on leader-member-exchange (LMX) has demonstrated some detrimental effects of differentiated leadership on team member relationship. Sherony and Green [9] found that coworker relationship quality increased as coworkers' similarity in leader-member-exchange (LMX) quality grew and decreased as similarity in LMX diminished. Within-team differentiated leadership results in the formation of sub-groups in teams: an in-group and an out-group, with the former enjoying a better relationship with the leader. Social psychologists argue that the in-group may seek positive distinctiveness through direct competition with the out-group; while the out-group may try to reverse the relative positions of the in-group on salient dimensions [10]. On a broader scale, when leaders do not treat every member equally, members also compete with each other for supervisor attention [11], and scarce resources such as opportunities to learn new things, skills, and abilities etc. [12]. As a result, higher differentiated individual-focused empowering leadership may lead to higher levels of intra-team competition. Thus, we predict the following:

Hypothesis 2a Differentiated individual-focused empowering leadership in encouraging self-development is positively related to intra-team competition.

Hypothesis 2b Differentiated individual-focused empowering leadership in participative goal setting is positively related to intra-team competition.

38.2.3 Intra-Team Collaboration and Team Effectiveness

We focus on team creativity and team performance as two measures of team effectiveness in the R&D context. A collaboration support all three components of creativity: expertise, creative-thinking skill and intrinsic task motivation [13]. The more often people exchange ideas and thoughts by working together, the more knowledge they will have, and the more expertise they will have. In fact, one way to enhance the creative thinking of employees is to expose them to various approaches to problem solving. In addition, insights and lessons learned by one member are shared so that all can benefit vicariously from others' experiences. Creativity is spurred when diverse ideas are united or when creative material in one domain inspires or forces fresh thinking in another [14]. These structural preconditions suggest that creativity is the consequence of a social system of actors that amplify or stifle one another's creativity. Dividing creativity into three phases: variation, selection and retention, Singh and Fleming [15] report that joint work

reduces the probability of very poor outcomes—because of more rigorous selection processes—while simultaneously increasing the probability of extremely successful outcomes—because of greater recombinant opportunity in creative search. We thus expect that intra-team collaboration directly enhances team creativity.

The whole team's performance also benefits as in a collaborative team environment. When team members collaborate toward a common goal, perceptions of shared fate is created and supportive behavior is promoted, whereby each group member looks out for the interests of the others. Members in a collaborative team will consider a task from a greater variety of viewpoints, and such broader consideration is more likely to uncover problems. As team members share valuable information and lesson-learned with each other, so some similar mistakes are avoided and pitfalls are shunned. Allen, Lee, and Tushman [16] found that overall technical performance of engineers working on developing new products or processes obtained great benefit from technical communication within the lab. We thus hypothesize:

Hypothesis 3a Intra-team collaboration is positively related to team creativity
Hypothesis 3b Intra-team collaboration is positively related to team performance.

38.2.4 Intra-Team Competition and Team Effectiveness

R&D work is often-times systemic and continuous, and may consist of multiple, con-current work flows that influence each other, i.e. highly interdependent [17]. In R&D teams, each member's work is dependent on the others. For overall performance and successful project integration, both intra-team and inter-team collaboration are vital [18, 19]. Intra-team competition, on the contrary, may be detrimental to R&D team effectiveness. Rather than share information and experience, people in competitive teams tend to keep valuable information proprietary. Moreover, rather than supporting each other, people in competitive environments may be motivated to impair the progress of others in an effort to gain positive advantage. Teammates are likely to remain indifferent to one another and avoid interacting for fear that doing so will result in exploitation [20]. The possibility also exists for teammates to interfere, obstruct, or in some other way make the behavior of another less effective [20]. Thus, intra-team competition may have negative influences on team effectiveness in both creativity and performance:

Hypothesis 4a Intra-team competition is negatively related to team creativity
Hypothesis 4b Intra-team competition is negatively related to team performance.

38.3 Methods

38.3.1 Sample and Procedures

We will test the model and hypotheses with data collected from a cross-sectional field study of employees in R&D departments from a system integration company headquartered in Taiwan.

38.3.1.1 Measures

Group-focused empowering leadership. Group-focused empowering leadership measurements are from Faraj and Sambamurthy [3]'s empowering leadership measurement of encouraging teamwork with 5 items. Wording of the items was adjusted to reflect team referent (e.g., "My team leader encourages us to work together with each other who are part of the team"). Measures use a scale anchored at 1 ("strongly disagree") and 7 ("Strongly agree"). Because intra-team collaboration is a group-level variable, individual level data need to be aggregated to the group level for analysis [21, 22]. Before aggregation is performed, individual level responses should be assessed whether satisfactory levels of intra-group agreement, inter-group variances, and reliability at the group level are achieved to justify aggregation [21, 22]. Three indices are calculated: First, average interrater agreement, Rwg, measures the amount of agreement among a single group of judges (employees, team members) [23]. Second, ICC1 (intraclass correlation 1) measures between group variances [21], and third, ICC2 (intraclass correlation 2) estimates the reliability at the group level [22]. These indexes ensure that the data has adequate within-group agreements and between-group variances, and thus fit for aggregation to the group level.

Differentiated individual-focused empowering leadership. Differentiated individual-focused empowering leadership has two dimensions: differentiation in encouraging self-development and differentiation in participative goal setting. Encouraging self-development (5-items) and participative goal setting (3-items) were from Faraj and Sambamurthy [3]'s empowering leadership measurement. Measures use a scale anchored at 1 ("strongly disagree") and 7 ("Strongly agree"). Differentiated leadership falls into Chan's [24]'s dispersion composition model, where within-group variation conveys the substantive meaning of a construct. Following Wu et al. [2]., we operationalize differentiated leadership with the coefficient of variation [25]. It is calculated by dividing the within-group standard deviation of the individual-focused leadership measure by the within-group mean of the same variable [3]. A large value of this coefficient indicates more variation in the group member's perceptions of leader behavior, given adjustment for mean differences between groups. Because there are two dimensions: encouraging self-development and participative goal setting, two scores were calculated for each team.

Intra-team competition. Intra-team competition is measured using within school competition scale from Mael and Ashford [26]. The original scale was developed to measure perceived competition among students attending the same school, and some items may not be readily applied in the work setting. Thus, the wording of the scale was modified to fit the working context. Because I intend to measure the climate of competition, not the causes of intra-team competition, one item addressing the source of competition: "My manager does not encourage competition among team members" was removed. During factor analysis, another item from the original scale "The climate of my team makes people try to be better than everyone else" was moved due to low factor loading in the work setting for this analysis. The final six-item scale focuses on perceived rivalry and social comparisons. Group-level variables are measured using individual respondents and aggregated to the group level after satisfactory ICC1 and ICC2 are achieved.

Intra-team collaboration. As collaboration has been studied mostly at the organizational or business unit level, measures of collaboration at the functional team level have been very limited. Thus, the measures of intra-team collaboration blended prior research from several scholars into one scale. It synthesizes scale items used in Aram and Morgan [27] for collective problem solving, Singh and Avital [28] and Baggs [29] for information sharing, Aram and Morgan [27] for help and support, Lin et al. [30] for collaborative working, and last, Singh and Avital [28] for task coordination. The scale reflects the willful contribution of personal effort, knowledge and resources to the completion of tasks of other team members towards common goals.

Team performance. Team performance was from Faraj and Sambamurthy [3]. We use a 1–5 scale, ranging from well below average to well above average. We asked team managers to assess the performance of their own team and compare their team with other R&D teams with which they were familiar on dimensions such as: budget performance, schedule performance, and the extent of meeting design objectives.

Team creativity. Team creativity was measured with Lovelace, Shapiro and Weingart [31]'s 4 items with a 1–5 scale from well below average to well above average. This too, was assessed by team managers of their own teams against other R&D teams with which they were familiar with. We ask about the innovativeness of the team's product, the number of innovations or new ideas introduced by the team, the team's overall technical performance, and the team's adaptability to changes.

Control variables. We controlled for major contextual factors that could be expected to influence team performance and creativity. Reward structure (the percentage of the reward that is individual-based vs. team-based) is believed to be part of the team contextual factors and motivations [32]. In line with prior research that measures pay mix as a ratio [33], I control for team reward structure with a single measurement reported by the manager "In my team, _____ % (a number between 1 and 100) of compensation is determined by individual performance, and _____ % (a number between 1 and 100, and should add to 100 with the previous number) of compensation is determined by team performance". Manager tenure,

history with the team (how long has the manager worked with the team) and team size are also controlled for.

38.4 Analysis and Results

To be added.

References

1. Chen G, Kirkman BL, Kanfer R, Allen D, Rosen B (2007) A multilevel study of leadership, empowerment, and performance in teams. J Appl Psychol 92:331–346
2. Wu JB, Tsui AS, Kinicki AJ (2010) Consequences of differentiated leadership in groups. Acad Manag J 53(1):90–106
3. Faraj S, Sambamurthy V (2006) Leadership of information systems development projects. IEEE Trans Eng Manage 53(2):238–249
4. Pearce CL, Sims HP Jr (2002) Vertical versus shared leadership as predictors of the effectiveness of change management teams: an examination of aversive, directive, transactional, transformational, and empowering leader behaviors. Group Dyn: Theory, Res, Practice 6:172–197
5. Jehn KA, Shah PP (1997) Interpersonal relationships and task performance: an examination of mediating processes in friendship and acquaintance groups. J Pers Soc Psychol 68:127–137
6. Manz CC, Sims HP (1987) Leading workers to lead themselves: the external leadership of self managing work teams. Adm Sci Q 32(1):106–128
7. Ajzen I, Fishbein M (1975) Understanding attitudes and predicting social behaviour. Prentice-Hall, New Jersey
8. Gagne M, Deci EL (2005) Self-determination theory and work motivation. J Organ Behav 26:331–362
9. Sherony KM, Green SG (2002) Coworker exchange: relationships between coworkers, leader–member exchange, and work attitudes. J Appl Psychol 87:542–548
10. Tajfel H, Turner JC (1979) An integrative theory of intergroup conflict. In: Austin WG, Worchel S (eds) The social psychology of intergroup relations. Brooks-Cole, Monterey
11. Thibaut JW, Kelley HH (2004) The Social Psychology of Groups. Transaction Publishers, New Brunswick
12. Johnson DW, Johnson RT (1989) Cooperation and competition: theory and research. Interaction Book Company, Edina
13. Amabile TM (1988) A model of creativity and innovation in organizations. Res Organ Behav 10:123–167
14. Uzzi B, Spiro J (2005) Collaboration and creativity: the small world problem. Am J Sociol 111(2):447–504
15. Singh J, Fleming L (2009) Lone inventors as sources of breakthroughs: myth or reality? Manage Sci 56(1):41–56
16. Allen TJ, Lee DM, Tushman ML (1980) R&D performance as a function of internal communication, project management, and the nature of the work. IEEE Trans Eng Manage 27(1):2–12

17. Mohrman SA (2003) Designing work for knowledge-based competition. In: Jackson SE, Hitt MA, DeNisi AS (eds) Managing knowledge for sustained competitive advantage: designing strategies for effective human resource management. Jossey-Bass, Newark
18. Hoegl M, Weinkauf K, Gemuenden HG (2004) Inter-team coordination, project commitment, and teamwork in multi team R&D projects: a longitudinal study. Organ Sci 15(1):38–55
19. Souder WE, Moenaert RK (1992) Integrating marketing and R&D project personnel within innovation projects: an information uncertainty model. J Manage Stud 29(4):485–512
20. Tjosvold D (1986) The dynamics of interdependence in organizations. Human Relat 39:517–540
21. James LR (1982) Aggregation bias in estimates of perceptual agreement. J Appl Psychol 67:219–229
22. Glick WH (1985) Conceptualizing and measuring organizational and psychological climate: Pitfalls in multilevel research. Acad Manag Rev 10:601–616
23. Chan D (1998) Functional relations among constructs in the same content domain at different levels: a typology of composition models. J Appl Psychol 83(2):234–246
24. James LR, Demaree RG, Wolf G (1984) Estimating within-group interrater reliability with and without response bias. J Appl Psychol 69(1):85–98
25. Allison PD (1978) Measures of Inequality. Am Sociol Rev 43(6):865–880
26. Mael F, Ashforth BE (1992) Alumni and their alma mater: a partial test of the reformulated model of organizational identification. J Organ Behav 13(2):103–123
27. Aram JD, Morgan CP (1976) The role of project team collaboration in R&D performance. Manage Sci 22(10):1127–1137
28. Singh B, Avital M (2007) The impact of collaboration and competition on project performance. In: Proceedings of the international conference on information systems (ICIS), Montreal, Canada
29. Baggs JG (1994) Development of an instrument to measure collaboration and satisfaction about care decisions. J Adv Nurs 20:176–182
30. Lin C-P, Wang Y-J, Tsai Y-H, Hsu Y-F (2010) Perceived job effectiveness in coopetition: a survey of virtual teams within business organizations. Comput Hum Behav 26(6):1598–1606
31. Lovelace K, Shapiro DL, Weingart LR (2001) Maximizing cross-functional new product team's innovativeness and constraint adherence: a conflict communications perspective. Acad Manag J 44(4):779–793
32. Beersma B, Hollenbeck JR, Humphrey SE, Moon H, Conlon DE, Ilgen DR (2003) Cooperation, competition, and team performance: toward a contingency approach. Acad Manag J 46(5):572–590
33. Zenger TR, Marshall CR (2000) Determinants of incentive intensity in group-based rewards. Acad Manag J 43(2):149–163