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The Role of Top-team Diversity and Perspective Taking in Mastering Organizational Ambidexterity

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ABSTRACT Although the role of top teams has been recognized in ambidextrous organizations, it remains unclear which characteristics and how the cognitive processes of top teams are used to address the dual cognitive challenges of ambidexterity. To address this puzzle, I developed a model in which I theorize that a top team with task-related diversity engaging in perspective taking will influence the achievement of an ambidextrous organization. Moreover, I further theorize that transformational leadership of the CEO will help diverse top teams master ambidexterity by influencing the team's cognitive processes. The results show that diverse teams can address the differentiating-integrating challenges of ambidexterity when they engage in perspective taking. The results also confirm that transformational leadership strengthens the relationship between a diverse top team's perspective taking and ambidextrous orientation.

KEYWORDS ambidextrous organization, perspective taking, team diversity, top management team, transformational leadership

INTRODUCTION

The importance of organizational ambidexterity – defined as simultaneously excelling at exploration and exploitation (Tushman & O'Reilly, 1996) – for firms to adapt to changing environmental conditions and obtain long-term success has been widely recognized (Jansen, Tempelaar, van den Bosch, & Volberda, 2009; Li, Chu, & Lin, 2010). Previous studies have argued that the work enabling organizational ambidexterity is frequently carried out in top management teams (TMTs) who define the agenda, set priorities, and allocate resources (Li, Lin, & Huang, 2014; Turner, Swart, & Maylor, 2013). In addition to the behavioral challenges (information processing and coordination demands; Lubatkin, Simsek, & Veiga, 2006), the pursuit of organizational ambidexterity entails another overarching cognitive challenge, the differentiation-integration requirement (Smith & Tushman, 2005). The cognitive challenge of differentiation calls for top managers to exhibit

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the cognitive slack in the strategic agendas, options, and perspectives for exploitation and exploration; whereas the cognitive challenge of integration calls for top managers to embrace distinctions between strategic agendas and maintain those distinctions within the top team (Smith, Binns, & Tushman, 2010).

Although researchers have accumulated knowledge on how TMTs address information processing and coordination demands of ambidexterity, such as TMT behavioral integration (e.g., Lubatkin, Simsek, & Veiga, 2006), less research attention has been devoted to the dual challenges of differentiation and integration. Answering Smith and Tushman's (2005) call for the explanation of how TMTs address the differentiation-integration challenge of ambidexterity, I seek to examine whether a diverse top team with perspective taking facilitates meeting the dual cognitive requirement. Among the diversity dimensions, this study focuses on task-related diversity – differences in educational background and job function of top team members – which has the potential benefit of shifting their focus from an either/or logic to a both/and logic regarding exploration and exploitation (Li, 2013), which is a key source of contradictory knowledge for the differentiation of ambidexterity.

However, diverse perspectives among top teams do not automatically trigger higher organizational ambidexterity that entails the cognitive challenge of integration. Instead, this requires that diverse top teams invest cognitive energy to interrelate distinct or contradictory knowledge and perspectives across top managers (Smith & Tushman, 2005). To explore how diverse top teams capture an ambidextrous orientation, I adopt the distributed cognition perspective, which is highly relevant to the interaction of individual cognitions of different team members (Shalley & Smith, 2008). Perspective-taking that entails sharing, discussing, and integrating the viewpoints of each teammate within a team (Parker, Atkins, & Axtell, 2008) is a critical team-level cognitive process linking diverse teams and complex cognitive challenges (Hoever, van Knippenberg, van Ginkel, & Barkema, 2012). Integrating top-team diversity and distributed cognition perspective, I argue that team perspective-taking can realize the strength of a diverse top team in pursuing both exploitation and exploration through elaborating teammate perspectives and enabling the integrating process. I propose that the interplay of top-team diversity, enlarged distinct knowledge and connections available to a top team, and perspective taking, mindfully elaborating such knowledge, can lead the top team to meet the cognitive challenge of ambidexterity. Although perspective taking seems important to foster the integration of contradictory perspectives or distinct knowledge, it plays no role in the current research on organizational ambidexterity. Instead, past research has focused on the direct effect of top team diversity on organizational ambidexterity (Buyl, Boone, & Matthyssens, 2013; Li, 2013). This study aims to provide new insights into how top-team composition interacts with team cognitive processes to address the dual cognitive challenges of ambidexterity.

To further understand how a top team builds organizational ambidexterity, it is also important to consider the role of the top-team leader. Past research has

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considered the unique role of the top-team leader in establishing an ambidextrous organization (Cao, Simsek, & Zhang, 2010; Fernández–Mesa, Iborra, & Safón, 2013; Rosing, Frese, & Bausch, 2011). In the current study, I propose the transformational leadership of the chief executive officer (CEO) as an additional factor to explain the ultimate influence of a diverse top team with perspective taking on ambidexterity. Transformational CEOs can facilitate sharing and integrating of each other's perspectives in diverse teams. By investigating the influence of CEO transformational leadership on the interplay of top-team diversity and top-team perspective taking, I offer an in-depth understanding of how CEO transformational leadership influences the top team in an ambidextrous organization.

THEORETICAL BACKGROUND AND HYPOTHESES

Previous studies have acknowledged that successful firms must possess the capability of combining exploratory and exploitative forces to become ambidextrous organizations (Benner & Tushman, 2003; Gibson & Birkinshaw, 2004; Raisch & Birkinshaw, 2008). Exploitation is related to efficiency, centralization, and tight cultures, whereas exploration is associated with flexibility, decentralization, and loose cultures.

Recent studies also have begun to focus on the role of top executives in ambidextrous organizations because they make decisions regarding organizational structure, culture, and resource allocation processes that influence the extent to which their firm can both explore and exploit (Nemanich & Vera, 2009). However, when pursuing an ambidextrous orientation, top teams have the cognitive requirement of differentiating strategic agendas for exploration and exploitation, such as a demarcation in established and new markets (Smith, Binns, & Tushman, 2010) or current and new technological competences (Tripsas & Gavetti, 2000). In addition, when combining exploration and exploitation within an organization (Smith & Tushman, 2005), top teams have encountered the cognitive requirement of integrating contradictory strategic agendas, such as identification of synergies between exploration and exploitation to strategically integrate both contradictory forces. Therefore, how the dual cognitive challenges can be resolved within a top team is a crucial issue for developing an ambidextrous orientation.

Top Management Team, Mastering Dual Cognitive Challenges, and Enabling Ambidexterity

Smith and Tushman (2005) suggested a conceptual model associated with top management and argued that achieving ambidexterity in contradictory contexts calls for top teams to meet the differentiation-integration requirement of ambidexterity. However, except for the conceptual framework, there is scant empirical research that examines how top-team compositions and cognitive processes would lead them to address the dual cognitive challenges in

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achieving ambidexterity. Drawing on the team diversity and distributed cognition perspectives, I investigate whether top-team diversity along with the team perspective taking process can integrate distinct insights for exploration and exploitation, and thus facilitating ambidexterity.

Top team diversity and organizational ambidexterity. A top team with heterogeneous backgrounds reflects various knowledge, skills, and abilities among top executives, which stimulates diversity in interpreting situations. This diversity broadens the thinking of top teams (Williams & O'Reilly, 1998) and may reduce inertia and consistency that hinder a top team's ability to be ambidextrous (Tushman & O'Reilly, 1997). Specifically, research has shown that demographic diversity can broaden the scope of the information collected and stimulate variety in interpreting situations (Pitcher & Smith, 2001), which can be a crucial source of differentiation cognition. Diversity in top teams, especially task-related diversity, provides them with a larger pool of perspectives, skills, and non-overlapping knowledge at their disposal (Carpenter, Geletkanycz, & Sanders, 2004).

The role of perspective taking. Perspective taking is a multifaceted concept, and has been defined as a personality trait, a sort of ability, a process, and an outcome (Parker, Atkins, & Axtell, 2008) and has varied in experiential aspects, such as perception, cognition, and affect (Kurdek & Rogdon, 1975). Most recent definitions have explicitly treated perspective taking as a cognitive process that entails attempting to clarify or consider the thoughts, motives, or feelings of others in relation to an object or topic, as well as why they think or feel the way they do (Caruso, Epley, & Bazerman, 2006; Parker, Atkins, & Axtell, 2008).

A concept related to perspective taking is empathy, which refers to an other-focused emotional response that allows one person to affectively connect with another (Galinsky, Maddux, Gilin, & White, 2008). Empathy involves an emotion of concern experienced when feeling another person's experience (Batson, Fultz, & Schoenrade, 1987). Perspective taking is more focused on cognitively considering the world from the viewpoint of others and it allows individuals to anticipate the behavior of others (Galinsky et al., 2008). In this study I consider perspective taking as a cognitive process that activates a set of cognitive procedures, in which members 'try to understand how others view the situation and try to ask themselves what is important to the other person' (Hoever et al., 2012: 987).

I also treated perspective taking as an emergent team-level cognitive process, in which top-team members adopt the viewpoints of other members in an attempt to understand their preferences, values, and needs (Parker & Axtell, 2001). Team perspective taking not only facilitates information exchange (e.g., Krauss & Fussell, 1991) but also engenders a comprehensive evaluation of the suggested ideas and an integration of different perspectives. This, in turn, may enable top teams to reconcile their conflicting interests (Park & Raile, 2010) and recognize methods in which contradictory strategies can be complementary (Rico, Sánchez-Manzanares,

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Gil, & Gibson, 2008). By sharing and elaborating on various perspectives, team perspective taking leads diverse top teams to recognize and articulate distinctions between exploration and exploitation as well as identify potential linkages between them (Smith & Tushman, 2005).

The effect of transformational leadership. The role of leadership, particularly of top-team leaders' transformational leadership, in supporting top teams to reconcile conflicting goals and to divide their time among multiple diverse tasks has been highlighted in the literature (e.g., Jansen, George, Van den Bosch, & Volberda, 2008). Transformational leadership as a multifaceted meta-construct exhibits idealized influence, arouses inspirational motivation, provides intellectual stimulation, and treats followers with individualized consideration (Avolio, Bass, & Jung, 1999). Idealized influence involves creating and presenting an attractive vision of the future, whereas inspirational motivation is expressed by energizing followers to rise above self-interest. Intellectual stimulation entails stimulating followers to challenge assumptions and view problems from new perspectives. Individualized consideration focuses on follower development by providing support, encouragement, and coaching. Prior studies have argued that transformational leaders enable ambidexterity in top teams by facilitating top-team processes (Gibson & Birkinshaw, 2004; Vera & Crossan, 2004). Hence, I propose that a CEO with transformational leadership influences the interplay of top-team diversity and team perspective taking.

In summary, I propose and test a model showing how top-team task-related diversity and perspective taking interact and how transformational leadership further enables a diverse top team with perspective taking to achieve organizational ambidexterity. Figure 1 presents this model.

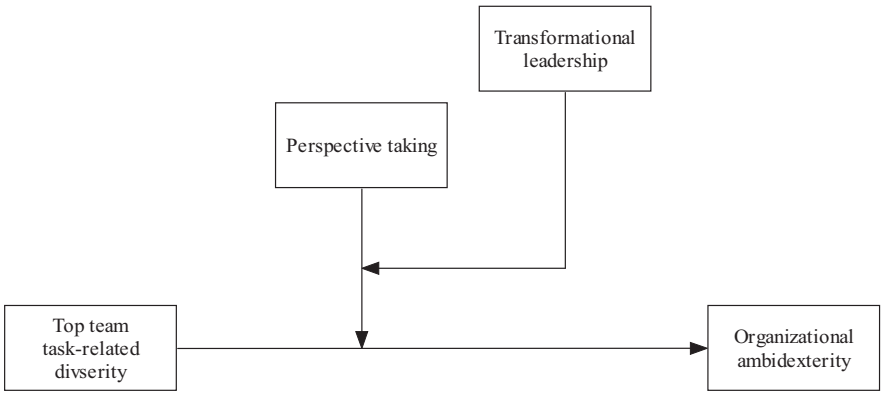

Figure 1. Research model of top team diversity and organizational ambidexterity

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Hypotheses

Top management teams with task-related cognitive diversity have multiple knowledge sources and decision-making styles and a greater variety of professional perspectives. Such heterogeneity directly enriches the amount of information available to a team and provides a broader range of information with minimal information overlap (Dahlin, Weingart, & Hinds, 2005). Broader information without overlap benefits the shaping of a set of complex mental templates that may enable top teams to foster differentiated insights and knowledge for exploration and exploitation. Conversely, researchers have suggested that homogeneous top teams are more prone to divert their attention to preserve consistency (Hambrick, Davison, Snell, & Snow, 1998). Thus, less task-related diversity is more likely to detract from bilateral exchanges, coupled with highly distilled communication among team members. This can all be harmful in establishing an ambidextrous organization that requires top teams to host internal inconsistencies and master strategic contradictions (Lubatkin et al., 2006).

Perspective taking enables members of diverse teams to consider their different evaluative standards regarding resource allocations to potential contradictory strategic choices (Krauss & Fussell, 1991). This process of elaborating on multiple viewpoints regarding resource allocation is necessary to avoid the inherent inclination to eliminate those distinctions. Taking another's perspective also may lead to the discovery of methods for integrating various perspectives (Boland & Tenkasi, 1995). By discovering how to integrate various viewpoints, a diverse team is likely to elaborate on diverse knowledge and reduce knowledge barriers to facilitate recognizing opportunities, linkages, and synergies that might arise from exploitative and exploratory activities. Thus, a diverse top team with team perspective taking facilitates recognizing and using distinct knowledge across top managers, and consequently addresses the dual cognitive challenges of ambidexterity. However, in homogeneous teams, perspective taking may be used to recognize shared information and limit the extent of elaboration (Hoever et al., 2012). Perspective-taking is unlikely to help a top team with low task diversity to recognize distinctions between exploration and exploitation and identify their potential synergies. Therefore, I propose the following hypothesis:

Hypothesis 1: The relationship between top team task-related diversity and organizational ambidexterity will be stronger under a high level than a low level of team perspective taking.

By providing inspirational motivation, transformational leaders foster identification with the team and its objectives (Bass & Riggio, 2006). Such identification motivates members to cooperate more fully with teammates and engage in more intensive exchanges (Shamir, House, & Arthur, 1993). The idealized influence of the transformational leader establishes a collective vision and enthusiasm that takes precedence over individual interests and goals (Shin & Zhou, 2007) by which team members are likely to contribute more and share all

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their task-relevant perspectives. Through intellectual stimulation and individualized consideration, transformational leaders create a team-learning context within diverse teams (Hoever et al., 2012) by which members are encouraged to view problems from diverse perspectives. In the team-learning context, team members create an open information exchange platform (Bass, 1998) by which they can elaborate on teammates' perspectives. In this sense, transformational leaders promote thorough sharing and exchange of all available task-relevant perspectives and information in diverse teams. Accordingly, I argue that CEO transformational leadership strengthens the effectiveness of a diverse top team engaging in perspective taking in pursing an ambidextrous orientation. I therefore posit the following:

Hypothesis 2: CEO transformational leadership will strengthen the interacting effect of top-team task-related diversity and perspective taking on organizational ambidexterity.

METHODS

Sample and Data Collection

Extant research suggests that when competition intensifies, product life cycles shorten, and the pace of change accelerates, firms increasingly need to be ambidextrous (Jansen et al., 2008). Taiwan's high-tech industries also pose these challenges and, thus, stimulate firms to act ambidextrously (Li, 2013). The context of Taiwanese high-tech firms offers a rich setting for examining the role of TMT in achieving ambidextrous organizations. Using a computer program, I randomly selected a total of 300 firms out of the total population of 1500 high-technology firms in a famous high-tech park located in Taiwan. I contacted each firm by phone to solicit its participation, and a total of 213 firms agreed to participate in this study. After excluding incomplete surveys from firms with fewer than 25 employees (where a real TMT is not present), I acquired usable questionnaires from 210 firms' CEO's and a total of 1321 of their top team members. Among the 210 firms, 20.5% are in information technology, 21.0% in telecommunications, 19.5% in electronics, 14.3% in biotechnology, 18.1% in new materials, and 6.7% in other industries. On average, they had US$ 18 million in sales. The average number of employees was 422 (S.D. = 184); and the average number of senior team members was 6.29 (ranged from 4 to 7 individuals). To test the non-response bias, the effective respondents were compared with the non-participating firms with regards to firm size, firm age, and sales. The analysis of variance test was not significant for firm size ($F = 1.17$), firm age ($F = 1.03$), and sales ($F = 1.56$), suggesting no response bias.

The survey instrument was originally prepared in English and then translated into Chinese. I used the traditional back-translation process to check for accuracy by two management researchers. It was then pilot-tested through in-depth group interviews with 12 team members of three high-tech firms to determine the face validity and relevance of the measures in the Chinese context. I also obtained feedback that

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pertained mainly to ambiguities or difficulties in responding to the items and suggestions for adaptations to improve the clarity of items for the respondents. I then revised the instrument accordingly.

The data were collected in three phases. First, I separately measured the main independent and dependent variables and collected the data of these research variables from multiple informants, including CEOs and their top team members. In this way, the potential concerns associated with common method bias can be eliminated. The survey for the CEO contains measures on exploratory innovation, exploitative innovation, environmental dynamism, and control variables. The survey for top team members contains measures on perspective taking, the CEO's transformational leadership, exploratory innovation, and exploitative innovation.

I used an onsite interview approach in which a trained interviewer scheduled appointments, presented the CEO with the survey and completed the survey through the personal interview. Each interview lasted an average of 50 minutes. Following the recommendations of Pitcher and Smith (2001), the CEO was asked to identify other top-team members directly involved in the important strategy decision-making and implementing. In this way, accuracy in defining the TMT was guaranteed.

Afterwards, the interviewer interviewed *all* members (four to seven) of the top team of each participating firm as a group. They completed the second survey questionnaire. Each group interview lasted an average 80 minutes. Moreover, 97.3% of participating members have served on their respective teams for at least five years, which showed a high level of stability in the composition in the sampled TMTs.

Pilot study for scale development and measurement validity. As there are no suitable measures for the perspective taking construct, I developed my own. Drawing on prior definitions and measures (Hoever et al., 2012), current work on perspective taking (Parker et al., 2008), and discussions with two management theory experts, I developed four items. The two researchers helped check the face validity, clarity, and relevance of the four-item scale. From the feedback, I made several changes in the wording to improve its clarity and to ensure clear understanding by the respondents. I then conducted a pilot-test to assess the validity. I gathered data from 178 top-team members in 38 high-tech firms. I measured team perspective taking, team information-sharing (Bunderson & Sutcliffe, 2002), and team learning behavior (Edmondson, 1999), which are related to team information processing. I tested a three factor measurement model with a CFA. The results showed that all items loaded significantly on the expected constructs, indicating convergent and discriminant validity of the measures. The fit indexes showed that the three-factor model fit the data reasonably well (chi-square = 29.34, df = 32, RMSEA = 0.00, GFI = 0.97, AGFI = 0.95, RMR = 0.02; the range of correlations: .11-.48), and better than one-factor model (chi-square = 242.30, df = 35, RMSEA = 0.18, GFI = 0.75, AGFI = 0.61, RMR = 0.09). I conducted a series of CFA to test whether a two-factor model of these three measures would

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fit better than a one-factor model for every pair of constructs (Bagozzi et al., 1991). In each case, the chi-square for the constrained model was significantly greater than the chi-square for the unconstrained model (perspective taking vs. information-sharing: chi-square difference = 198.70, d.f. = 1; information-sharing vs. learning-behavior: chi-square difference = 145.73, d.f. = 1; perspective taking vs. learning: chi-square difference = 161.99, d.f. = 1). The three measures of team perspective taking, team information-exchange, and team learning behavior were moderately correlated, providing evidence of convergent validity.

Furthermore, I presumed that firm-level exploration and exploitation are orthogonal because the analysis focused on the company that could buffer exploratory efforts from exploitative activities through physically separating them across different and loosely connected units (Gupta, Smith, & Shalley, 2006; O'Reily & Tushman, 2004). I used confirmatory factor analysis (CFA) to examine the validity of the exploratory innovation and exploitative innovation scales. The fit indices showed that the measurement model fit the data reasonably well (chi-square = 62.75, $p > 0.05$; CFI = 0.99; IFI = 0.99; RMSEA = 0.01; SRMR = 0.01), and all of the items within the expected factors have highly significant standardized loadings. These two factors demonstrate good convergent validity and reliability with a composite reliability for exploratory innovation (0.91), and exploitative innovation (0.92) (Fornell & Larker, 1981). I also assess the discriminant validity of the two factors by CFAs to test whether a two-factor model fits the data better than a one-factor model (Bagozzi, Yi, & Philips, 1991). The results demonstrated that the chi-square in the constrained model (correlation fixed as 1) was significantly greater than the chi-square for the unconstrained model (correlation estimated freely) (constrained model: chi-square = 4788.66, d.f. = 54, $p < 0.05$; unconstrained model: chi-square = 62.75, d.f. = 53, $p > 0.05$; the difference of chi-square = 4725.91, d.f. = 1, $p < 0.05$), suggesting good discriminant validity (Anderson & Gerbing, 1988). To assess the validity of CEO rating for organizational ambidexterity, I conducted a correlation test between CEO rating and TMT rating of organizational ambidexterity. I used interrater and intraclass measures to demonstrate within-team agreement and between-team differences for exploratory and exploitative innovation to justify for the aggregation of both variables. Interrater and intraclass measures (exploration: rwg = .92, range = 0.80–0.99, ICC [1] = .15, ICC [2] = .52; exploitation: rwg = .92, range = 0.78–0.99, ICC [1] = .19, ICC [2] = .60) justified aggregation across raters (James et al., 1984). Then, the correlation between CEO rating and TMT rating of organizational ambidexterity was 0.89, which provides evidence of the validity of the data obtained in the CEO.

Measures

All measures are multiple-item scales with a seven-point Likert response and are reported in the appendix. Task-related heterogeneity was measured as the

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TMT's diversity with respect to functional and educational background. The CEO was asked to classify each manager's dominant functional expertise using the nine functional groups: marketing, sales/customer service, finance/accounting, general management, human resources/personnel, information technology, operations/distribution/logistics, R&D, and administrative support. Team members were also asked to provide information on the academic field in which they had obtained their highest degree. Following previous works (e.g., Carpenter & Fredrickson, 2001; Lee & Park, 2006), I used five educational specializations (arts, sciences, engineering, business and economics, and law) to categorize each top manager's academic field. Heterogeneity in educational and functional background was quantified using Blau's heterogeneity index (Blau, 1977) because both were categorical variables. A high score on the Blau's index indicates more diversity in background (educational or functional) between the members of the senior team. Task-related diversity refers to differences in knowledge bases and perspectives that members bring to the team. Such differences are likely to arise as a function of differences among members in education and function (Naranjo-Gil, Hartmann, & Mass, 2008), which lead to a focus on task-related differences in themselves rather than on their content. In this sense, individual task-related differences are best interpreted as an amalgamation (e.g., Campion, Medsker, & Higgs, 1993; Chatman, Polzer, Barsade, & Neale, 1998; Jehn, Northcraft, & Neale, 1999; van Knippenberg & Schippers, 2007). Therefore, I averaged the educational and functional diversity scores to create an overall measure of task-related diversity.

Following the literature, I requested that CEOs from each firm evaluate firm-level exploration and firm-level exploitation. Following Jansen, van den Bosch, and Volberda (2006), I used a six-item scale ($\alpha = 0.91$) to measured firm-level exploration that captures the extent to which firms depart from existing knowledge and pursue radical innovations for emerging customers or markets. I used a six-item scale measured firm-level exploitation ($\alpha = 0.92$) that tap the extent to which firms build on existing knowledge and pursue incremental innovations to meet the demands of existing customers or markets.

Prior studies have presented distinct approaches to operationalize organizational ambidexterity, including multiplying, subtracting, and adding (Junni, Ssrala, Taras, & Tarba, 2013). Following the suggestions of Lubatkin et al. (2006), I used the procedures recommended by Edwards (1994) to confirm these distinct approaches. The results showed that the additive and multiplying models were better than the subtracting approach. The F-values of the additive and multiplying model have no significant loss of information compared to the unconstrained model. Yet, the R-square (0.22) of the additive model is only slightly higher than for the multiplicative model (0.21). Prior studies have explicitly taken the multiplicative interaction of firm-level exploration and exploitation as organizational ambidexterity into consideration (e.g., Jansen et al., 2008; Nemanich & Vera, 2009) when both types of activities are orthogonal. Thus, in this study I used the multiplying approach to measure *organizational ambidexterity* that computed

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the multiplicative interaction between firm-level exploration and firm-level exploitation.

The new four-item scale on *perspective taking* ($\alpha = 0.88$) ask key informants to indicate the extent to which they take each member's perspectives at work and during group discussions. The measure of agreement among team members' ratings produced the mean rwg of 0.93 (range = 0.80–0.99), an ICC (1) of 0.18, and an ICC (2) of 0.58, suggesting that aggregating the responses to the team level was appropriate.

I measured *transformational leadership* ($\alpha = 0.97$) with a 20-item Multifactor leadership Questionnaire developed by Bass and Avolio (1995). I asked key informants to evaluate how frequently their CEO engaged in transformational leadership, consisting of four items for each of intellectual stimulation, inspirational motivation, and individualized consideration, and eight items for idealized influence. I also performed a second order factor with four-factor model to test whether the data supported the four-dimension structure. The results indicated that the second order model had an approximately acceptable fit with the data (chi-square = 205.66, df = 166, p = 0.02, RMSEA = 0.03, CFI = 0.99, IFI = 0.99, TLI = 0.99). Consequently, I averaged the items to create the composite index for transformational leadership, consistent with previous research (Nemanich & Vera, 2009). The agreement among team members' ratings has a mean rwg of 0.93 (rang = 0.84–0.99), an ICC (1) of 0.18, and an ICC (2) of 0.58, supporting aggregating the responses to the team level.

Control Variables

I included several control variables. Firm size was measured by the natural logarithm of the number of full-time employees, to control for slack resource in larger firms. Because environmental dynamism may influence performance, the implication of exploration and exploitation (Yang & Li, 2011), I used a five-item scale ($\alpha = 0.89$) to measure the unpredictability of changes and the instability of the external environment. In addition, in keeping with Li (2013), I controlled for internal social capital, measured by TMT rating, to partial out any potential effects on organizational ambidexterity. We used the scale from Li (2013) to measure internal social capital, in which a four-item scale was used to measure connectedness ($\alpha = 0.84$), four items were measured trust ($\alpha = 0.86$), and a five-item scale was measured TMT shared vision ($\alpha = 0.89$). I also controlled for potential effects of R&D intensity, measured as R&D investments as a percentage of sales, on innovations. I further controlled for firm age (years since inception) and past performance (measured by the firm's growth rate in the prior three years). Both may influence the investment of exploration and exploitation. In addition, CEO gender was included by a dummy variable, because Eagly and Carli (2003) indicated that gender may influence the extent to which executive directors are accepted as legitimate leaders. CEO tenure is also included as a control because of its influence

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on top-team effectiveness (Wu, Levitas, & Priem, 2005). Non-task-related diversity was included to control their effects. Age diversity was measured through the variation in top team members' age (standard deviation divided by the mean). I measured gender diversity by Blau's (1977) index of heterogeneity. Because industry type may influence on engaging in exploratory and exploitative innovations (He & Wong, 2004), five dummy variables were used to measure industry effects. Finally, I used top management team size, measured as the number of members on the team, to control the influence of size on the dynamics in strategy implementing processes.

Measurement Validity

I constructed an integrated confirmatory factory analysis to test convergent and discriminant validity of the study variables. The results indicate that the items loaded significantly on the expected constructs, demonstrating convergent validity. The fit of the model with four factors, including exploration, exploitation, transformational leadership, and perspective taking (chi-square = 672.112, df = 623, $p > 0.05$, RMSEA = 0.01, CFI = 0.99, IFI = 0.99, TLI = 0.99) was compared with the fits of three potential alternatives. The first alternative was a three-factor model with exploratory innovation and exploitative innovation to represent an ambidexterity factor (chi-square = 5403.38, df = 626, $p < 0.01$, RMSEA = 0.08, CFI = 0.86, IFI = 0.86, TLI = 0.85), and the second alternative model was a two-factor model collapsing exploratory innovation, exploitative innovation, and perspective-taking into one factor (chi-square = 9253.61, df = 628, $p < 0.01$, RMSEA = 0.09, CFI = 0.75, IFI = 0.75, TLI = 0.74); and a one-factor model (chi-square = 14415.26, df = 629, $p < 0.01$, RMSEA = 0.13, CFI = 0.60, IFI = 0.60, TLI = 0.58). The fit indexes of the four-factor model are acceptable and a better fit than all the alternative models. Table 1 shows that the diagonal elements representing the square roots of the average variance extracted (AVE) for each of the constructs is greater than the off-diagonal elements, which satisfies the criterion of discriminant validity (Fornell & Larcker, 1981). Finally, the constructs' alpha and the composite reliabilities (CRs) presented in Table 1 indicate that each exceeded the accepted reliability threshold of 0.70. Table 1 presents the correlations and descriptive statistics of the constructs.

Analyses

In this study, a hierarchical regression analysis was conducted to examine Hypotheses 1 and 2. The constituent variables were mean-centered prior to creating the interaction or product terms to eliminate multicollinearity (Aiken & West, 1991). Variance inflation factors were estimated to examine collinearity levels and found to be below four. Using the procedure described by Aiken and West (1991), I also conducted simple slopes analysis for all interactions. We plotted these interaction

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Table 1. Correlation matrix and descriptive statistics of measures

Variables	*Mean*	*S.D.*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*
1. Ambidexterity	22.77	3.21	n.a.																		
2. Perspective taking	4.74	0.41	0.29	0.81																	
3. Transformational leadership	4.70	0.39	0.19	0.05	0.78																
4. Environmental dynamism	4.65	0.68	0.31	0.00	0.11	0.79															
5. Top team task-related diversity	0.53	0.08	0.31	0.19	0.25	0.13	n.a.														
6. Firm size (log)	5.92	0.56	−0.02	0.00	−0.02	0.02	−0.13	n.a.													
7. Top team size	6.29	1.04	0.03	−0.01	−0.02	0.01	−0.08	0.09	n.a.												
8. R&D intensity	6.52	1.93	0.19	−0.07	0.10	−0.08	0.10	−0.06	0.06	n.a.											
9. Firm age	9.05	2.87	0.04	0.03	0.04	0.04	0.09	0.03	−0.05	0.03	n.a.										
10. Past firm performance	24.97	14.70	−0.03	−0.08	0.16	−0.05	0.06	0.04	0.02	0.07	0.03	n.a.									
11. CEO gender	0.92	0.27	−0.05	0.07	0.05	0.05	0.05	−0.07	−0.06	0.02	0.18	0.13	n.a.								
12. CEO tenure	7.16	3.14	0.04	0.02	0.04	0.04	0.07	0.00	−0.07	0.02	0.89	0.05	0.14	n.a.							
13. Top team gender diversity	0.73	0.09	−0.02	0.02	0.06	−0.01	0.03	−0.02	−0.04	0.04	−0.12	0.06	−0.12	−0.06	n.a.						
14. Top team age diversity	0.81	0.06	0.04	0.04	−0.09	−0.07	−0.10	0.09	0.12	0.00	0.16	−0.01	−0.01	0.14	−0.05	n.a.					
15. TMT trust relationship	4.72	0.67	0.42	−0.02	0.20	0.26	0.19	0.00	0.03	0.43	0.02	0.07	−0.01	0.08	0.06	−0.07	n.a.				
16. TMT shared vision	4.63	0.67	0.49	0.23	0.21	0.25	0.34	−0.04	0.00	0.29	0.12	−0.03	−0.03	0.14	0.02	−0.01	0.69	n.a.			
17. TMT connectedness	4.66	0.68	0.04	0.22	−0.07	0.00	0.10	−0.01	−0.01	0.02	0.08	−0.10	0.05	0.05	−0.03	0.10	−0.13	−0.12	n.a.		
18. Exploratory innovation	4.73	0.38	0.83	0.17	0.20	0.39	0.28	−0.01	−0.02	0.04	0.00	0.03	0.03	0.01	−0.05	0.04	0.29	0.28	0.09	0.79	
19. Exploitative innovation	4.80	0.42	0.83	0.29	0.10	0.13	0.22	−0.01	0.08	0.27	0.06	−0.07	−0.11	0.04	0.01	0.02	0.41	0.51	−0.03	0.38	0.81
Composite reliability (CR)			n.a.	0.88	0.97	0.89	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a.	n.a.	n.a.	n.a.	0.91	0.92

Note: The diagonal elements are square roots of the AVE. For all correlation above $|0.11|$, $p < 0.05$

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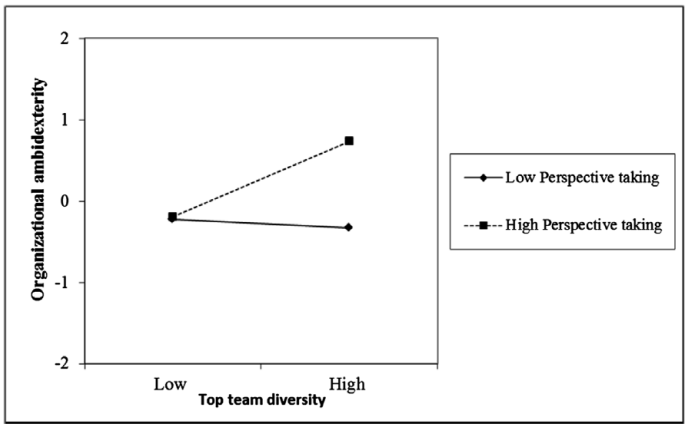

Figure 2. Interaction effect of top team diversity with perspective taking on organizational ambidexterity

effects for two levels of moderators (transformational leadership and perspective taking), defining the low level as minus one standard deviation from the mean and the high level as plus one standard deviation from the mean. Regarding the two-way interaction, for each level of perspective taking, we plotted the relationship between TMT diversity and organizational ambidexterity. In terms of the three-way interaction, for each level of transformational leadership, we plotted the relationship between TMT diversity and organizational ambidexterity for low and high levels of perspective taking.

RESULTS

The regression results are summarized in Table 2. Hypothesis 1 suggested that the interaction of top team task-related diversity and team perspective taking are positively related to the ambidexterity of their firms As shown in models 3 of Table 2, the interaction of perspective taking with top team diversity is significant and positive for organizational ambidexterity ($\beta = 0.21$, $p < 0.01$). Figure 2 depicts the interaction. The slope was significant and positive when top team perspective taking was high ($\beta = 0.37$, $t = 4.03$, $p < 0.001$) and nonsignificant when it was low (0.14, $t = 1.13$, n.s.). In fact, there appears to be no relationship between top management team diversity and organizational ambidexterity for those teams with low perspective taking. Therefore, results support Hypothesis 1.

Hypothesis 2 stated that CEO's transformational leadership influences the interacting effect of top team task-related diversity and perspective taking on ambidexterity of their firms. As shown in models 4 of Table 2, the three-way interaction is found to be significant and positive for organizational ambidexterity ($\beta = 0.29$, $p < 0.001$). The graph of this interaction (Figure 3) indicates that the relationship between top team diversity and the organizational

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Table 2. Results of regression analysis for organizational ambidexterity

	Organizational ambidexterity			
Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*
Control variable				
Environmental dynamism	0.21	0.21	0.18	0.15
	(3.45)**	(3.54)**	(3.11)**	(2.58)*
R&D intensity	0.04	0.07	0.04	− 0.02
	(0.57)	(1.00)	(0.56)	(− 0.25)
Firm size	− 0.01	− 0.00	− 0.00	− 0.03
	(− 0.18)	(− 0.07)	(− 0.05)	(− 0.49)
Firm age	0.07	0.06	0.06	0.04
	(0.47)	(0.45)	(0.48)	(0.34)
Past firm performance	0.01	− 0.01	− 0.00	− 0.00
	(0.08)	(− 0.18)	(− 0.06)	(− 0.00)
CEO gender	− 0.06	− 0.09	− 0.07	− 0.06
	(− 1.18)	(− 1.82)	(− 1.43)	(− 1.31)
CEO tenure	− 0.10	− 0.09	− 0.07	− 0.04
	(− 0.71)	(− 0.69)	(− 0.54)	(− 0.35)
Top team gender diversity	− 0.04	− 0.06	− 0.06	− 0.08
	(− 0.69)	(− 0.97)	(− 1.14)	(− 1.59)
Top team age diversity	0.06	0.08	0.06	0.07
	(0.90)	(1.20)	(1.03)	(1.14)
Top team size	0.00	0.00	− 0.02	− 0.01
	(0.07)	(0.07)	(− 0.27)	(− 0.18)
TMT trusting relationship	0.13	0.20	0.28	0.27
	(1.27)	(1.97)*	(2.72)*	(2.61)*
TMT shared vision	0.34	0.16	0.08	0.11
	(3.35)**	(1.48)	(0.67)	(0.94)
TMT connectedness	0.09	0.02	− 0.04	− 0.04
	(1.60)	(0.29)	(− 0.72)	(− 0.74)
Information technology	0.12	0.12	0.13	0.05
	(1.07)	(1.26)	(1.36)	(0.58)
Telecommunications	0.05	0.13	0.12	0.04
	(0.55)	(1.59)	(1.41)	(0.52)
Electronics	0.06	0.08	0.08	0.05
	(0.55)	(0.83)	(0.87)	(0.53)
Biotechnology	0.11	0.13	0.10	0.06
	(1.22)	(1.53)	(1.16)	(0.83)
New materials	0.08	0.12	0.11	0.06
	(0.80)	(1.51)	(1.35)	(0.77)
Independent variable				
Top team task-related diversity		0.14	0.11	0.07
		(2.07)*	(1.41)	(0.99)
Perspective taking		0.24	0.31	0.22
		(3.95)***	(4.70)***	(3.43)*
Transformational leadership		0.06	0.00	− 0.03
		(1.01)	(0.06)	(− 0.67)
Two-way interactions				
Top team task-related diversity X			0.21	0.23
Perspective taking			(3.49)**	(4.53)***
Top team task-related diversity X			0.07	− 0.07
Transformational leadership			(1.17)	(− 0.97)
Perspective taking X			0.10	0.17

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Table 2. Continued

	Organizational ambidexterity			
Variable	*Model 1*	*Model 2*	*Model 3*	*Model 4*
Transformational leadership			(1.58)	(3.09)**
Three-way interaction				
Top team task-related diversity X				0.29
Perspective taking X				(4.61)***
Transformational leadership				
R^2	0.31	0.38	0.44	0.48
Adjusted R^2	0.25	0.32	0.37	0.42
$\triangle R^2$		0.07**	0.06**	0.04**

Notes: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
This report shows standardized regression coefficients (t-value is in parentheses). The t-value results from ***robust standard error.***

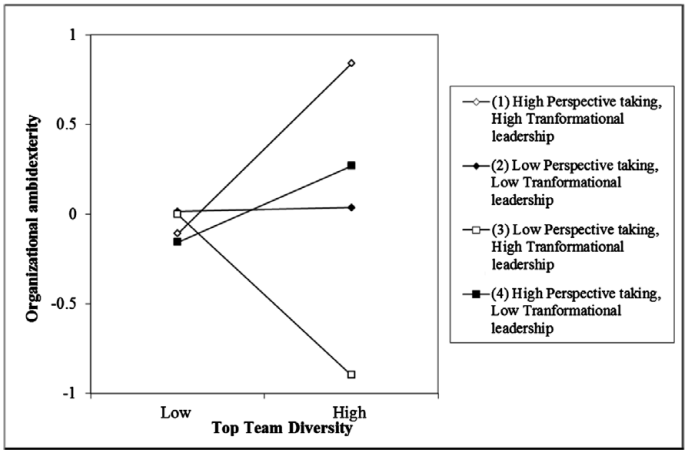

Figure 3. Interaction effect of top team diversity with perspective taking and CEO's transformational leadership on organizational ambidexterity

ambidexterity is most positive when their perspective taking and CEO's transformational leadership are both high. Therefore, Hypothesis 2 also, receives support.

DISCUSSION

Because top management teams are important for ambidextrous organizations, I propose that team diversity can help a top team address the dual cognitive challenges of ambidexterity. The results showed that task-related diverse top management teams with high team perspective taking have an enhanced ability to combine both contradictory forces and support firm ambidexterity. These results offer empirical support for the conceptual work by Smith and Tushman (2005), arguing that a

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top team with the differentiating-integrating cognition helps firms explore and exploit simultaneously. The effect of facilitating various team processes indicates transformational leadership of top-team leaders as a potent factor in explaining when and how diverse top teams with high other-referential cognition processing become more ambidextrous. The findings support the hypothesized three-way interaction role of transformational leadership, which strengthens the effectiveness of a diverse team with high perspective taking in pursuing an ambidextrous orientation.

Theoretical Implications

The findings contribute to understanding the relationship between top management teams and ambidextrous organizations in several ways. First, this study responded to calls to systematically explore how top-team cognitive frames interacting with cognitive processes address the differentiating-integrating challenges of ambidexterity (Smith & Tushman, 2005). A previous study highlighting the role of top management teams in achieving ambidexterity (Jansen et al., 2008) was unclear regarding which characteristics and how cognitive processes of top teams are used to manage the challenges associated with mastering strategic contradictions. In this study, I found that the interaction of top teams with task-related diversity and high perspective taking among team members allows them to effectively embrace, rather than avoid, contradictions and achieve balanced strategic decisions in ambidextrous organizations.

This study was triggered by the observation that recent studies increasingly highlight the importance of investigating the role of top management in ambidextrous organizations (Li, Lin, & Huang, 2014). However, the literature provides scant evidence regarding which characteristics make top teams successful at managing strategic contradictions in ambidextrous organizations. Adopting Smith and Tushman's (2005) conceptual model and the distributed cognition perspective, I proposed top-team diversity to be a key characteristic that provides complex mental frames to address the differentiating cognition of ambidexterity. The results of this study indicated that diversity in functional and educational dimensions supports the notion of cognitive diversity enabling complex cognitive tasks (van Knippenberg, De Dreu, & Homan, 2004).

The findings also contribute to the structural and behavioral approach on ambidexterity research by documenting the importance of the cognitive dimensions of team processes in fueling ambidexterity. Perspective taking helps teams with a dual-way mental frame to resolve conflicting interests because it engenders a comprehensive evaluation of various ideas and facilitates integrating diverse perspectives (Galinsky et al., 2008). This research presents a novel view of top-team cognitive processes that enable firm ambidexterity. It adds to the previous literature on how structural and behavioral dimensions of team processes, such as social

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networks (e.g., Jansen et al., 2008) and behavioral integration (e.g., Lubatkin et al., 2006), support ambidexterity.

The third contribution is addressing whether and how the leadership style of top-team leaders plays a role in firm ambidexterity. I found support that task-related diverse top teams are likely associated with high levels of firm ambidexterity when transformational leaders motivate top team members to take other members' perspectives. The findings are consistent with prior studies arguing that the top-team leaders have a unique influence in supporting firm ambidexterity (Gibson & Birkinshaw, 2004; Nemanich & Vera, 2009), which should be considered separate from that of top team members. The most surprising finding was the nonsignificant interaction of transformational leadership and top-team diversity. This result contradicts the preponderance of findings in the transformational leadership literature (Kearney, Geber, & Voelpel, 2009). A possible explanation is that transformational leadership exploits the benefits of team diversity only when it can foster the utilization of an enlarged pool of ideas and perspectives (Kearney et al., 2009). Thus, a diverse top team with a transformational leader may achieve organizational ambidexterity only when the leader can stimulate team members to take teammate perspectives.

Implications for Practice

The results suggest that structuring a task-related diverse top team with high team perspective taking is beneficial in building ambidextrous organizations. However, firms should realize that top-team diversity might be difficult to implement, as empirical studies have found that top teams in several countries are strikingly homogeneous (e.g., Campbell & Minguez-Vera, 2008). Thus, firms should design appropriate selection and promotion policies to ensure that sufficient diversity exists within the team when filling management positions.

To facilitate ambidexterity, the results indicate that designing a top team with high levels of task-related diversity creates complex mental templates, and that team cognitive process—perspective taking—enables diverse top teams to master strategic contradictions. This suggests that top-team leaders should consider training on perspective taking within the top management team and support the team process by creating motivating conditions, such as a reward structure enabling them to empathize with others' ideas and become more aware of differences (Homan, Hollenbeck, Humphrey, van Knippenberg, Ilgen, & van Kleef, 2008).

Because the strategic leadership of top-team leaders has a critical influence in supporting ambidexterity, top-team leaders or CEOs must be skilled in transformational leadership that facilitates various top-team processes. Firms must be aware that it is worthwhile to help top team leaders to become more transformational in their leadership style. They should know that leadership behavior can be learned or adjusted (Kirkbride, 2006), through training programs,

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such as the "Full Range Leadership Program" workshop by Avolio and Bass (1991). Such training provides guidelines or coaching on specific behaviors that enable top-team leaders to increase top-team member perceptions of their transformational leadership.

Limitations and Future Research

Several limitations should be considered when interpreting the results of this study. The first and major limitation is that the measure of top-team diversity in this study focused only on functional and educational backgrounds. The measure does not cover all job- or task-related heterogeneity dimensions considered in previous studies (e.g., Naranjo-Gil et al., 2008). Future research should explore other dimensions of job- or task-related diversity such as tenure, which may further extend and discover the influences of top-team task-related composition in achieving organizational ambidexterity. Second, I adopted a self-reported method to measure the study variables. This may have increased the possibility of common method variance, even though I was careful in separating the collected data on the independent and dependent variables, and used multiple respondents.

Several other limitations may provide avenues for further research. The model assumes that perspective taking within top teams causes additional information elaboration. I did not examine the role of team information elaboration. A prior study indicated that team information elaboration may have an important mediating influence on the link between team diversity and team outcomes (Kearney et al., 2009). Future research that incorporates the mediating role of team information elaboration may help explain more variance regarding how top-team composition achieves organizational ambidexterity. This study examines the team cognitive process as a way to help top teams address the dual challenges of ambidexterity. Other team cognitive processes may exist. One example is Taoism from Chinese culture, which includes, but is not limited to, carefully taking differentiated insights. Taoism emphasizes the harmonious alignment of contradiction (i.e., Yin vs. Yang; Jing & Van de Ven, 2014) and dialectic thinking (Schimmack, Oishi, & Diener, 2005), which may enable diverse top teams to effectively meet the differentiation-integration requirement of ambidexterity. Thus, an interesting direction for future research might be to develop a measure to capture the philosophy of Taoism and then examine it as a potential mechanism. Further, team perspective taking provides only a partial explanation regarding the role of top team processes. Future studies may examine other relevant team processes or leader–team dynamics, such as team motivational processes (i.e., task cohesion and collective efficacy), team affective processes (i.e., conflict control and team emotion control norms), and team coordination processes (Zaccaro, Rittman, & Marks, 2001).

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CONCLUSION

How top management teams can address the dual challenge of differentiation and integration has been a central question in organizational ambidexterity research. To explore this challenge, I adopt the distributed cognition perspective to suggest that a diverse top team with perspective taking partially addresses the differentiation-integration challenge. The results of the current study show that the relationship between top-team diversity and organizational ambidexterity will be stronger when high team perspective-taking is present. Further, a CEO who practices transformational leadership can further enhance the interacting effect of team perspective taking. I call for studies to apply the view of Taoism of Chinese culture to gain insight into top team diversity and team cognitive process for managers and teams in the Chinese context. I hope that this study will stimulate further development in understanding top-team composition, cognitive processes and executive leadership for addressing the dual challenges of ambidexterity.

NOTE

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APPENDIX I

Measures and Confirmatory Factor Analysis Results

Construct and Source	*Operational Measure*	*SFL*	*t-value*
Exploration (Jansen et al., 2006)	Over the last three years, to what extent has your firm		
	1. Our organization accepts demands that go beyond existing products and services	0.80	8.03
	2. We invent new products and services	0.80	7.39
	3. We experiment with new products and services in our local market	0.78	8.65
	4. We commercialize products and services that are completely new to our organization	0.79	8.33
	5. We frequently utilize new opportunities in new markets	0.79	8.73
	6. Our organization regularly uses new distribution channels	0.80	7.24
Exploitation (Jansen et al., 2006)	Over the last three years, to what extent has your firm		
	1. We frequently refine the provision of existing products and services	0.81	5.67
	2. We regularly implement small adaptations to existing products and services	0.80	5.51
	3. We introduce improved, but existing products and services for out local market	0.81	6.90
	4. We improve our provision's efficiency of products and services	0.80	7.32
	5. We increase economies of scales in existing markets	0.80	6.67
	6. Our organization expands services for existing clients	0.83	7.96
Perspective taking	1. During the group discussion, we frequently try to take each individual member's perspectives.	0.81	6.92
	2. At work, we often imagine how each individual member is feeling	0.81	7.20
	3. During the group discussion, we make an effort to see the world through each individual member's eyes	0.82	6.08
	4. At work, we regularly seek to understand each individual member's viewpoints.	0.80	6.18
Environmental dynamism (Yang & Li, 2011)	1. Environmental changes in our local market are intense	0.78	6.41
	2. Our clients regularly ask for new products and services	0.83	7.41
	3. In our local market, changes are taking place continuously	0.81	7.49
	4. In a year, nothing has changed in our market	0.78	5.50
	5. In our market, the volumes of products and services to be delivered change fast and often	0.76	8.50

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Construct and Source	*Operational Measure*	*SFL*	*t-value*
Top team leaders transformational leadership	Our leader		
	1. Seeks new opportunities for our organization.	0.77	8.31
	2. Paints an interesting picture of the future for our work group.	0.80	7.69
	3. Leads by "doing" rather than simply by "telling."	0.78	8.54
	4. Fosters collaboration among work groups.	0.79	10.05
	5. Shows subordinates that he/she expects a lot from them.	0.78	9.07
	6. Provides individuals with new ways of looking at things which are puzzling to them.	0.79	8.45
	7. Has a clear understanding of where we are going.	0.79	8.95
	8. Provides a good model to follow.	0.78	8.60
	9. Encourages employees to be "team players."	0.79	8.27
	10. Insists on only the best performance from us.	0.78	8.07
	11. Shows respect for individuals' feelings.	0.78	8.66
	12. Has ideas that have forced individuals to rethink some of their own ideas.	0.79	8.88
	13. Inspires others with his/her plans for the future.	0.78	9.11
	14. Leads by example.	0.77	8.15
	15. Gets the group to work together toward the same goal.	0.79	9.38
	16. Does not settle for second best from subordinates.	0.79	8.71
	17. Behaves in a manner that is thoughtful of individuals' personal needs.	0.78	8.51
	18. Stimulates individuals to think about old problems in new ways.	0.78	7.77
	19. Is able to get others to commit to his/her dream(s) for the future.	0.78	9.16
	20. Develops a team attitude and spirit among his/her employees.	0.80	8.90

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