Top Management Team Tenure Diversity and Performance: The Moderating Role of Behavioral Integration

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Forthcoming IEEE-TEM

KEY WORDS: Top Management Team; tenure diversity; tenure variety; tenure separation; behavioral integration

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I.   INTRODUCTION

Over the past three decades, there has been a plethora of research examining the effect of team composition, especially diversity on organizational level outcomes such as innovation [1] and new product performance [2]. Results to date however have been inconsistent [3]. This is reflected most when examining the most consequential of all the teams in a firm – the top management team (TMT). The inconclusiveness of the literature is quite regrettable given the role of TMTs in developing the technological capabilities of the firm [4], and the centrality of TMT diversity in formulating appropriate competitive actions to adequately utilize the firm's technological resources [5].

The question of how TMT diversity affects performance clearly still remains unanswered. TMT diversity refers to the distribution of differences among TMT members along any common attribute (e.g. demographic characteristics) [6] that may lead to the perception that one member is different from another [7]. Some scholars suggest that TMT diversity has a positive influence on TMT performance. Hambrick, Cho, and Chen (1996) [8] for example find that TMT diversity facilitates strategic decisions, improves the quality of decision making and thus benefits firm performance. Other scholars argue that TMT diversity negatively affects TMT performance. Simons, Pelled, and Smith (1999) [9] for example find that TMT diversity does not improve team performance, but rather creates intra-group conflict detrimental to team performance. Furthermore, some scholars suggest no significant relationship between TMT diversity and TMT

performance. Webber and Donahue (2001) [10] find that neither job-related TMT diversity nor non-job-related TMT diversity significantly influences TMT performance. These contradictory findings are especially worrisome given the wealth of upper echelons research that has examined TMT diversity. Clearly understanding the effect of TMT diversity and the processes that underlie this effect is still a challenge for scholars.

Researchers have proposed several explanations for the contradictory and inconclusive findings regarding the effect of TMT diversity on performance. First, Van Knippenberg, De Dreu, and Homan (2004) [11] proposed that modeling the underlying processes of positive and negative effects of diversity in an integrated framework would greatly increase the predictive power of diversity research. Second, Harrison and Sin (2006) [12] argued against the use of composite indices of diversity in favor of theorizing and measuring individual attributes separately. Finally, Hambrick (1994) [13] argued for the examination of moderating (especially behavioral) processes that may influence the effect of diversity on performance.

This paper nudges the research on the effect of TMT diversity on performance forward by incorporating the aforementioned suggestions in developing a model that examines how TMT tenure diversity affects performance. We focus on tenure diversity because tenure incorporates both demographic differences (non-job related) and functional (job related) differences. Demographic differences underlie the social categorization research that has argued for a negative relationship between team diversity and performance (e.g. [9]) while functional differences drive the information processing research that propose a positive relationship between team diversity and performance (e.g. [5]). In this paper, we propose that these two opposing processes that underlie the relationship between TMT tenure diversity and performance: information processing and social categorization can occur simultaneously, with

opposing effects because they are driven by different types of diversity. Harrison and Klein (2007) [6] identify team diversity variety and team diversity separation as the two main dimensions of team diversity. TMT tenure variety is defined as differences in TMT members' know-how and experiences while TMT tenure separation is defined as the gaps in attitude and distance perception [6]. We argue that tenure variety affects the information processes within the TMT while tenure separation affects the TMT social categorization process. These relationships however are not linear as TMTs will face diminishing returns (costs) to diversity. Moreover, we argue that the effects of TMT tenure variety and separation on firm performance are moderated by the level of behavioral integration of the TMT, which emphasizes the contingent influence of the decision making processes within the TMT. We test our framework on a sample TMTs from 126 Chinese corporations.

This study thus contributes to the upper echelons literature in several ways. First, prior TMT diversity research has examined different components of TMT diversity, such as age, tenure, educational background and functional background jointly. Scant research (e.g. [1]) however, has investigated TMT diversity from an attribute level; that is, focus only on the diversity of one TMT attribute, and examine the various dimensions that may exist within that attribute. This is particularly problematic because as Harrison and Sin (2006) [12] point out, diversity is attribute specific. A team per se is not diverse, but rather diverse with respect to a specific attribute [6]. The higher level focus of prior studies could in part explain the inconclusiveness of current literature. This paper focuses on one specific attribute – tenure diversity, and examines in detail the various types of tenure diversity. We focus on two types of TMT tenure diversity (tenure variety and tenure separation) and empirically examine how the two types affect TMT performance.

Second, we propose a theoretical framework that integrates the underlying processes of information processing and social categorization as two conflicting processes that occur simultaneously within TMT due to TMT tenure diversity. Previous research either emphasized the process of information processing, which suggests a positive effect of TMT diversity on firm performance [8], or focused on the process of social categorization, which predicts a negative effect of TMT diversity on firm performance [14]. This utilization of divergent theoretical frameworks, without their reconciliation by prior literature could explain the inconclusive findings on the TMT diversity-firm performance relationship. As Milliken and Martins (1996, p. 403) [15] aptly noted, "diversity appears to be a double-edged sword, increasing the opportunity for creativity as well as the likelihood that group members will be dissatisfied and fail to identify with the group." We integrate and reconcile the predictions of these two processes by arguing that they are driven by different types of diversity – diversity variety and diversity separation.

Third, we contribute to the literature by showing that these effects are nonlinear. Specifically, we argue and show that while tenure diversity variety has a positive impact on team performance, it does so at a diminishing rate. An additional team member who increases tenure diversity variety will have less of a positive influence on team performance than the preceding team member. Conversely, while tenure diversity separation has a negative impact on team performance, it does so at an increasing rate. An additional team member who increases team tenure separation will have more of a negative effect on team performance than the preceding team member. Therefore knowing the contemporaneous level of team tenure diversity is central to understand what the marginal effect of increasing team tenure diversity would be on team performance.

Lastly, this study incorporates an important moderating mechanism (i.e., behavioral

integration) proposed by Hambrick (1994) into the investigation of the effect of TMT tenure

diversity on TMT performance. TMT demographic attributes such as tenure are latent without

the team interacting with each other. As such, we argue that the level of behavioral integration of

TMTs affects both the information processing and social categorization processes and thus

moderates the effect of TMT tenure diversity on performance. It implies that TMT behavioral

integration is a crucial variable in leveraging or hindering the effect TMT tenure diversity on

performance. The incorporation of this key mechanism suggests the effect of TMT tenure

diversity is contingent on the decision making processes within the TMT.

II.   THEORETICAL BACKGROUND AND HYPOTHESES

TMT tenure refers to the time between the current year and the year that the senior

manager joined a firm [14]. With different tenures, senior managers may differ in their

commitment to the firm, risk orientation and insights [8]. Consistent with the inconclusive

findings of the broader diversity research, prior research on the performance effect of TMT

tenure diversity has also been contradictory. For example, Simons et al. (1999) [9] find that TMT

tenure diversity can improve job-related skills, information and perspectives thus having a

positive effect on performance. In contrast, Tyran and Gibson (2008) [16] find that when the

tenures of TMT members are very close (i.e. less diversity), they are more likely to show similar

behavior patterns, beliefs and expectations, have more interactive communications and thus

generate team identity and cohesion, resulting in higher performance [17].

Furthermore, TMT tenure reflects the key salient attributes of diversity reflected in TMT

research, namely, social category diversity and informational/functional diversity [15], [18].

Social category diversity refers to visible and readily observable differences such as sex, gender

and age. Informational diversity refers to less visible but job related underlying attributes such as

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functional and educational background [11]. Since TMT tenure is functional and job related, it reflects the information/functional process. In addition however, TMT tenure is also readily observable to other TMT members, and thus it can reflect the social categorization process. These processes underlie the two main research traditions on diversity and performance, namely social categorization and information/ decision-making perspectives [19]. As such, TMT tenure diversity provides a vehicle for investigating how both information/decision-making and social categorization processes occur simultaneously within TMTs.

The information/decision-making perspective focuses primarily on the tendency of the TMT to communicate frequently within their network. Individuals in diverse groups will have access to information from dissimilar networks outside their groups. The information processing perspective emanates from an open systems view of organizations in which the organization needs to continually adapt to its environment and thus the key tasks of the TMT is to manage uncertainties that arise from this environment [20]. Organizational information processing theory suggests that organizations manage external uncertainties through the information processing system. The variety of information from outside networks enriches decision-making within the team and thus enhances performance [21]. Furthermore, diversity of a job-related attribute will increase the team's knowledge, skills and abilities (KSAs) [22]. As a result, research based on information/decision-making postulates a positive effect of team diversity on performance.

Conversely, social categorization research argues that individuals use salient attributes such as demography to classify themselves and others into social categories [23]. This enables an individual to identify with similar members of the group. Tajfel (1982) [24] argued that the identification in knowledge, emotion and value with other members enables a person to become the member of a group. To the extent that members perceive themselves to be similar or different

based on this within group comparison, intergroup discrimination will emerge. The similarity/attraction paradigm postulates that individuals will become favorable to in-group members while hostile to out-group members [25]. The process of social categorization can therefore induce discrimination by creating in-groups/out-groups and concomitant cognitive biases [26]. In diverse groups, such effect is demonstrated by lowered cohesion, reduced communication and more intensive conflict [27]. Not surprisingly therefore, research based on social categorization have generally found a negative effect of diversity on performance [18], [19].

The underpinnings of both positive and negative effects of diversity on performance are well researched. It is not clear however how diversity can negatively affect performance while at the same time positively affect performance [28]. Indeed, how can both the social categorization and the information/decision-making processes simultaneously exist within a team? Unfortunately, most empirical research to date has focused on one perspective without adequately investigating how the two processes can exist simultaneously within a team and to what effect.

We reconcile both perspectives by proposing that social category diversity and informational diversity each affects performance through separate types of diversity. Harrison and Klein (2007) [6] proposed a typology characterizing diversity as consisting of three distinct types. First there is diversity variety, which is the 'composition of differences in kind, source, or category of relevant knowledge or experience among unit member' [6, p.1203]. It captures the breadth of unique or distinctive information within the team. Second, diversity separation which is the composition of differences within team members of opinion is driven mainly by values, belief or attitude. It captures the level of disagreement within the team. Finally there is diversity

disparity. This is the difference in distribution of socially valued assets or resources within the team, such as 'pay, power, prestige, status,' which are not related to either in information processing or social categorization perspective [6, p.1206]. It captures the power concentration within the team. Because power distribution within TMTs is by title (i.e. the CEO is the team leader), there is little variance across TMTs with respect to tenure diversity disparity. Thus while conceptualizations of diversity variety and separation are widely used in the organizational literature, diversity disparity is less so, and rather utilized more in the sociology literature [6]. We argue that the information/functional process is driven in a team by its tenure diversity variety while the social categorization process is driven by the team's tenure diversity separation. We explore in detail below how tenure diversity variety and tenure diversity separation each differentially affects team performance through the information and social categorization processes respectively.

A. *Tenure Diversity Variety*

Tenure diversity variety reflects the breadth of knowledge available to a TMT from differences in the team tenures of members. It is the informational differences among team members such that the different tenure categories contribute to team diversity. For example, a team with a maximum amount of tenure diversity variety would have a team member in every team tenure category [29]. Tenure variety encapsulates the breadth of knowledge, information and cognitive perspectives available to the team due to tenure differences [6]. It is these differences, i.e. diversity variety, that underlie the research on theories based on information processing [29].

Different levels of organizational units are setup to process information and the TMT is the most important and the highest level unit for processing information. TMT members who

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join an organization at proximate same time periods can have similar understandings of work issues [30]. A TMT composed of senior managers with different tenures thus has a variety of information sources and perspectives [31], leading to differences in members' knowledge; that is, team variety [6]. Tenure variety reflects diversified experience, information basis and internal and external networks [21].

From the information processing perspective, when firms confront complex and unconventional issues, the TMT can be more efficient if TMT members have diversified skills, knowledge, capabilities and beliefs [32]. TMT tenure variety endows the team a breadth of information sources [14]. Such diversified information allows the TMT to analyze issues from more perspectives, conduct a more comprehensive evaluation of alternatives, and thus make a high-quality decision, improving TMT performance [19].

We however do not expect the effect of tenure variety on team performance to be linear. The marginal value of information to the team decreases as the number of perspectives (variety) increases [33]. Take for example at the lowest variety level when all team members have exactly the same tenure, a new member to the team (having a different tenure), brings the largest increase in perspective and information. They essentially double the information capacity of the team. However, if TMT members already belong to 4 different tenure categories, adding a new team member (in a new tenure category) provides only an incremental 20% information variety to the team.

Thus:

> ***Hypothesis 1：TMT tenure diversity variety has a non-linear relationship with team performance; that is TMT tenure diversity variety will have a positive effect on team performance, but at a diminishing marginal rate.***

B. Tenure Diversity Separation

Diversity separation encompasses the differences among TMT members in their lateral position on a continuum such as value, attitude or belief [6]. The degree of separation is driven by the extent to which TMT members have similar tenures and not the tenure per se [29]. For example, a TMT with all the same long tenure (e.g. all joined the team at firm founding) and a TMT with all new members (e.g. a new CEO brings in all new executives) will both be equally homogenous. Tenure separation reflects how visibly different team members and thus captures their level of disagreement in opinions, values, and attitudes especially with regards to team goals and processes [6]. Greater tenure separation as such means greater dissimilarity among members. TMT diversity research that builds on social categorization processes therefore reflects diversity separation.

 Individuals conduct social comparison due to demands for self-esteem. Before the comparison, individuals will define themselves by categorizing themselves and others into different social categories. Social identity is generated when individuals think they belong to the group. With social identity, individuals will appreciate their group while having bias to individuals in other groups [34]. Similarly, Byrne (1971) [35] suggests that similar individuals are more likely to be attracted to each other. People are more likely to cooperate and trust those similar to themselves, while discriminating against those perceived to be different. Tenure separation accentuates the 'us versus them' tendency in individuals.

As TMT tenure separation increases, gaps between senior managers in attitude and distance perception become more apparent and thus social categorization emerges [19]. Within the team, separated sub-groups generate a strong sense of distance perception, leading to intergroup discrimination and subsequent passive personal relationships [36]. Cognitive conflict between TMT members emerges, resulting in communication costs between team members, or

worse, resulting in communication failure [37].

With TMT tenure separation, top managers will be more aware of the distance between each other [38] resulting in additional complexity in strategic decisions and thus negatively affecting team outcomes [14]. Furthermore, with increases in TMT tenure diversity, TMT members will focus more on their own subgroups while paying less attention to the team as a whole, resulting in even less interaction between members [39]. As a result, TMT members will share less information [11], and have a lower level of social integration and thus lower team performance [21].

Similar to tenure variety, the effect of tenure separation on team performance is however not linear. Maximum team separation occurs when team members align on two equally balanced categories farthest from each other. Team members are therefore polarized along two extreme and opposing factions [6]. This is most deleterious for team performance. With no team members bridging the structural divide, the TMT degenerates into two dense cliques with allegiances and communication mainly within the subgroup and not the TMT. At moderate levels of separation, most team members align on the same position with just a few members holding different positions. There is some, but limited disagreement within the team. At minimum separation, all team members occupy the same position. There is perfect agreement within the team [40]. Increasing tenure separation from minimum to moderate is likely not going to result in performance repercussions for the team as the few team members holding minority opinions are likely to seek compromise than isolate themselves. Increasing tenure separation from moderate towards maximum is likely to result in even greater deleterious effects on performance and subgroups start emerging and staking their positions.

Thus:

Hypothesis 2：TMT tenure diversity separation has a non-linear relationship with team performance; that is TMT tenure diversity separation will have a negative effect on team performance, and at an increasing marginal rate.

C. The Moderating Role of TMT Behavioral Integration

Prior team research has examined the role of team processes, focusing on communication quality [41], communication frequency [42], social integration [25], and interdependence [43], [44]. Although these studies greatly enhanced our understanding of team processes, they focused on individual aspects such as team leadership, team conflict and team communication [41]. TMT behavioral integration has emerged in the literature as a composite multi-level concept that integrates the various team processes and represents the mental and practical collective interactions among TMT members [13]. Hambrick (1994) defined behavior integration as "the degree to which mutual and collective interaction exists within the group" (p188) and proposed that behavioral integration is manifested in three interdependent processes that strengthen each other. These three processes are team cooperative activities that refer to top managers' collaborative behaviors through sharing their expertise and experiences, internal information exchange that refers to communication among top managers to exchange their views, and joint decision making that refers to top managers' establishment of a common view in major decisions [45]. Research on behavioral integration has shown that it affects team outcomes (e.g., [46], [47]). Ancona and Caldwell (1989) [48] and Hambrick (1994) [13] suggest that a team has to be integrated to take full advantage of the benefits of diversity. As such, in this study, we propose that TMT behavioral integrate moderates the effect of TMT tenure diversity on firm performance.

TMT behavioral integration affects both the information process and the social categorization process, but in different ways. Beginning with the positive effect of the

information process, TMT behavioral integration facilitates the externalization of tacit

knowledge held by TMT members such that the benefits of the variety of information held by a

diverse TMT is even more enhanced [47]. Hambrick (1998) [36] suggests that behavioral

integration can enable a TMT to integrate knowledge and insights of TMT members to form

core competences and thus effectively respond to market changes.

With increasing levels of TMT behavioral integration, the TMT can better integrate and

utilize the tacit knowledge and insights within the team through more effective information

exchange. Moreover, the knowledge and insights held by TMTs with diverse tenures can be

better integrated to enable top managers to evaluate alternatives more comprehensively and

make joint decisions more wisely [49]. Therefore the positive effect of TMT tenure variety on

performance will be enhanced if the team is also behaviorally integrated.

Hypothesis 3：The level of TMT behavioral integration will moderate the relationship

between tenure diversity variety and team performance such that the positive relationship will

be strengthened with increasing TMT behavioral integration.

The behavioral integration of the TMT also moderates the effect of social categorization.

When behavioral integration within a TMT is high, there is an increased demand and need for the

bandwidth to process more and complex information among team members [49]. However,

TMTs with higher tenure separation may not interact. They are more likely to be aware of their

own subgroups, conduct social comparison to generate intergroup discrimination, be more aware

of the distance between members [38] and thus lack a sense of identity [14]. If the team is highly

behaviorally integrated, information exchange, cooperation and joint decision making within the

team can be even hindered to worsen the effect of social categorization on TMT performance.

Within such a team, information exchange can be conducted less effectively because behavioral

integration can exaggerate the conflict between members due to increased intergroup discrimination. In this case, the more integrated behaviors between members, the higher the communication costs and the worse the quantity and the quality of information exchange, resulting in a lower level of cooperation and collaborative decision making. Cognitive conflict between TMT members worsens [50], resulting in communication costs. Thus, with a higher level of behavioral integration, the negative effect of TMT tenure diversity on performance worsens.

Therefore, we propose that

Hypothesis 4：The level of TMT behavioral integration will moderate the relationship between tenure diversity separation and team performance such that the negative relationship will be strengthened with increasing TMT behavioral integration.

III.   METHOD

A. Data Collection

Data for this study was collected by questionnaire between December 2010 and April 2011. The relatively compressed timeline ensures the consistency of external environment among all interviewed TMTs. To reduce potential bias due to differences in the economy and culture across different regions in China, we chose firms from six different provinces in eastern, central and western China. In China, the main economic development regions include the Yangtze River region, Pearl River region, Bohai Sea region, Western region, Northeastern region and Middle region. These six provinces represent different levels of economic development and even different cultures (subcultures) across different regions in China. Table 1 shows the

descriptive characteristics of the sample firms in terms of firm age, ownership type, size and development stage[1].

Insert Table 1 about here

Our sample firms were randomly selected from a list registered corporations provided by the Economy Commerce Committee, a special administrative setup of the government for managing firms. With the support of local authorities, we obtained a list of more than 1000 firms, and randomly chose 300 firms as the target firms for our sample.

The questionnaire was originally designed in English based on the top management team literature. Four bilingual experts translated the questionnaire into Chinese. The Chinese version was subsequently back-translated into English by a third party and compared to the original to ensure accuracy [53]. Next, a pilot test was conducted with five managers. During the process, interviewers checked each item with pre-testers to make sure every question could be accurately understood. To guarantee the correct understanding of each question, detailed instructions were provided in the questionnaires. Respondents were top managers, which ensured that they were knowledgeable and possessed accurate information about their firms' strategic management practices. For each company, the CEO and other TMT members were interviewed separately. This reduced the potential for bias [54].

In order to ensure the reliability of the data from sample firms, we asked at least three members of the top management team to answer our questionnaires independently. Respondents to this survey were CEOs and other senior executives (e.g., CFO/COO/SVP) identified to be

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[1] Development stage refers to the stage of a firm's life cycle; that is, 1) Introduction: in this stage, firms experience high risks, driven by tasks with short-term pressures; 2) Growth: in this stage, firms are moving fast with abundant market opportunities; 3) Maturity: in this stage, firms may not be eager to excel further but focus on stability with more intensive industrial competition; 4) Decline: in this stage, firms have to face decreasing profit margin with severe price competition [51], [52].

members of the TMT. In total, we sent out questionnaires to 300 enterprises and collected 510

answers from 182 firms representing a 60% response rate. We checked for potential non-

response bias between firms that did not respond and the 182 firms that responded. All t-values

from the responding and non-responding firms on main characteristics such as firm size, age and

ownership status were not statistically significant. Thus, we concluded that the sample was

representative [55].

We adopted two criteria to delete invalid answers: (1) if five continuous questions of a

questionnaire were not completed, the questionnaire was considered invalid. (2) If more than ten

continuous questions of a questionnaire had the same answers, the questionnaire was considered

invalid. Following that criteria, we ended up with a sample of 357 validated responses from 126

firms, representing an effective response rate of 42 percent, which is at an acceptable level when

studying top management teams [56]. The descriptive statistics of TMT members is shown on

Table 2.

Insert Table 2 about here

B. Measures

TMT performance. TMT performance was measured using four items from a scale

validated by Ancona and Caldwell's (1992) [21] and also used by Hempel, Zhang, and Han

(2012) [57]. Using Likert scales ranging from 1 'far below average' to 5 'far above average' it

asked TMT members to indicate to the performance of their TMT relative to industry peers on:

(1) Efficiency; (2) Quality; (3) Technical innovation; (4) Work excellence. All evaluations of

TMT members were averaged. Principal component analysis indicated that all items loaded on a

single factor, with an eigenvalue of 2.19, accounting for 62.73 percent of the variance and factor

loadings ranging from 0. 75 to 0.85 (c.f., Table 3). The Cronbach's coefficient alpha for this scale

is 0.80 (Table 3).

Independent Variables. Drawing insights from Harrison and Klein (2007) [6], we utilize two component dimensions of team tenure diversity: tenure variety and tenure separation.

Tenure variety. Tenure variety represents various sources of knowledge that can affect their decisions, because team members within a team may have diverse access to different sources of information due to the differences in their tenures [6]. The Herfindahl index [55] is commonly used to measure the degree of variety of a team attribute [56], [57]. Following the recommendation of Harrison and Klein (2007) [6], TMT tenure variety is measured by the formula $H=1-\sum P_k^2$, where P_k represents the proportion of TMT members in the K-type tenure category, while K-type refers to tenure type 1 to tenure type 7. Higher H values signify greater tenure variety within the TMT. In this study, we divide the tenure of TMT into seven categories with three-year intervals: Type 1: one to three years; type two: four to six years; type 3: seven to nine years; type 4: ten to twelve years; type 5: thirteen to fifteen years; type 6: sixteen to eighteen years; type 7: greater than nineteen years. We adopt a three-year interval for two reasons: 1) it is consistent with previous studies [61]; 2) based on statistics of the sample, of the 357 managers, there are 107 managers with a less-than 3 year tenure; 183 managers with a less-than 5 year tenure. Thus, a wider interval will lead to much less variation and more skewed distribution.

Tenure separation. Tenure separation represents the sense of distance or separation team members feel towards each other due to different organizational tenures. As recommended by Harrison and Klein (2007) [6], the standard deviation (SD) of the team tenure is used to measure tenure separation. The greater the standard deviation, the higher the tenure separation.

TMT's behavioral integration. Hambrick (1994) [13] conceptualized behavioral integration as the mental and practical collective interactions among TMT members. It is

measured by three key items: (1) quantity and quality of information exchange, (2) the level of cooperative behavior, and (3) joint decision-making [13]. Halevi, Carmeli, and Brueller (2015) [62] and Carmeli and Schaubroeck (2006) [49] used the scale of Simsek et al. (2005) [45] to measure TMT behavioral integration when investigating TMT behavioral integration's effect on decision quality. Siegel and Hambrick (2005) [63] further pointed out that these three processes reinforce each other, and thus become more representative of team integrity and consistency than a single structural process, such as internal cohesion, social integration, or communication quality. Simsek et al. (2005) [45] emphasized the free exchange of information, conflict resolution, establishment of a common view, and implementation of integrated strategies and methods to improve firm development as defining features of TMT behavioral integration. Starting from the behavioral integration definition by Hambrick (1994) [13], they separate behavioral integration into three dimensions: cooperative behavior, information exchange, and joint decision-making, and use nine items to measure behavioral integration. The three items of cooperative behaviors include: (1) when a team member is busy, other team members often volunteer to help manage the workload; (2) team members are flexible about switching responsibilities to make things easier for each other; (3) team members are willing to help each other complete jobs and meet deadlines. The three items to measure information exchange include: (1) team members can compare ideas regularly; (2) during the discussion, team members can put forward qualified solutions; (3) through the communication, team members can produce high level of creativity and innovation. The three items of joint decision-making include: (1) team members usually let each other know when their actions affect another team member's work; (2) team members have a clear understanding of the joint problems and needs of other team members; (3) team members usually discuss their expectations of each other.

Principal component analysis of behavioral integration indicated that all items loaded on a single factor, with an eigenvalue of 5.29, accounting for 70.78% of the variance and factor loadings ranging from 0.80 to 0.87 (c.f., Table 3a and Table 3b). The Cronbach's alpha for this scale is 0.79.

Insert Tables 3a and 3b about here

Controls variables. We control for a number of factors that might influence TMT performance. *Firm age* is measured by the differences between 2011 and the firm's founding year [64]. *Firm size* is measured by the number employees a firm has [64]. Compared to large corporations, small-scale corporations maintain a relatively simple organizational structure and operational procedures. Type of firm ownership also is an important organizational characteristic. Thus, we control the *ownership structure* by asking respondents to indicate the current nature of the ownership of the firm as one of the followings: state-owned, privately owned, foreign (included JVs and wholly foreign-owned), domestic JVs, or others [65]. Moreover, to control for industry effects, we used dummy variable in which High-tech firms were rated as 1 and the other firms were rated as 0 [66].

Since their growing-up environment and education differ, older managers will have different values and behavior from younger managers. Younger managers will implement innovative and unprecedented strategies [67] and also bring more novel knowledge to their firms [32]. In contrast, older managers prefer maintaining the status quo [7] to adopting new ideas or initiatives [32]. The greater diversity of age among team members, the more conflict in the decision-making process. As such, we also control for *age diversity*, which was calculated as the standard deviation divided by the mean [67].Further, abundant studies prove that the diversity of both educational background and functional background will affect firm performance, because

team members from different functional departments or with different educational backgrounds

can bring diverse knowledge, skills, experience, and other alternatives to the team [7]. According

to information processing theory, differences in knowledge, skills, experience, and other

alternatives facilitate the team to make high-quality decisions, and finally have an impact on

corporation performance [19]. For this reason, we also control for *diversity of educational*

background and *diversity of functional background*, which are measured with Blau's (1977) [58]

Herfindal-Hirschman index, calculated as $1 - \Sigma Si^2$, where *Si* is the proportion of TMT members in

the *i*th category [67] (Table 2). We also control for tenure disparity, which may affect the tenure

diversity and TMT performance and is calculated as SD(D)/Dmean [6].

IV.   RESULTS

We used the OLS (Ordinary Least Square) regression model to test our hypotheses. In the

first step, the regression model 1 included control variables only. In the second step, we added the

tenure variety and tenure separation in the regression model 2. Finally, we added behavioral

integration as a moderating factor in Model 3. Table 4 shows the descriptive statistics and bivariate

correlations of variables in this study. In the analyses, the highest VIF is 3.01, which suggests that

no potential multicollinearity issues exist in our regression analyses.

Insert Table 4 about here

The results of our hypotheses are shown on Table 5. All indicated significance levels are

with a two-tailed test. From models 2 to 7, the industry effects are mostly significant, which

suggest that proposed relationships of this research are especially important to firms located in

high-technology industries. Hence, technology managers need to be aware influence of TMT

tenure variety.

Hypothesis 1 argued that TMT tenure diversity variety has a non-linear relationship with team performance; that is, it has a positive relationship with team performance, but at a decreasing marginal rate. We used a main effect and a squared variety term to capture the marginal effect at lower and higher levels. From table 5, model 2, the tenure variety coefficient is positive and statistically significant (0.31, p<0.001) while from model 3 the tenure variety square coefficient is negative and statistically significant (-0.13, p<0.001). Figure 1 provides a graphic representation of these results. From the figure, the slope of the effect curve though positive is decreasing as tenure variety increases. This provides support for H1. Not only is the marginal effect of tenure variety increasing at a decreasing rate, at some threshold (0.90 in figure 1), it actually turns negative as the cognitive costs of assimilating more information outweigh the benefit of an additional perspective. The threshold of 0.90 established in figure 1 is outside the tenure variety range of TMTs in our sample. Hypothesis 1 is thus supported.

Insert Figure 1 about here

Hypothesis 2 proposed that TMT tenure separation will have a non-linear relationship with team performance; that is, it have a negative effect on team performance, but at an increasing rate. We also used a main effect and a squared variety term to capture the marginal effect at lower and higher levels. Table 3 model 5 shows the Tenure separation coefficient to be positive and significant (0.17, p<0.05), while from model 6, the tenure separation square coefficient is negative and significant (-0.10, p<0.05). Figure 2 provides a graphic representation of this result. At very low levels of tenure separation the marginal effect increasing tenure separation is actually positive. As tenure separation increases however, this effect quickly turns negative with increasingly steeper slope. The threshold at which tenure separation in Figure 2

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turns negative is 1.82. There are only 10 (7.94%) of firms in our sample to the left (i.e. with

positive effect) of this threshold. This provides support for hypothesis 2.

Insert Figure 2 about here

Hypothesis 3 proposes that the level of behavioral integration of TMTs moderates the

relationship between TMT tenure variety and TMT performance. Unfortunately, results shown in

Model 4, the interaction terms between TMT tenure variety and behavioral integration is not

significant (0.01, p>0.1 for tenure variety; -0.01 , p>0.1 for tenure variety squared), which does

not provide support to Hypothesis 3. Hypothesis 4 proposes that the level of behavioral

integration of TMTs moderates the relationship between TMT tenure separation and TMT

performance. The results in model 6 and model 7 show that the coefficient of the interaction term

between behavioral integration and TMT tenure separation is positive statistically significant

(0.19, p<0.05), the coefficient of the interaction term between behavioral integration and TMT

tenure separation square is negative and statistically significant (-0.12, p<0.05) with a significant

changed R^2 (0.04, p<0.05).

Insert Table 5 about here

Figure 3 shows this interaction result graphically. The interaction plot is plotted at one

standard deviation (SD) above or below the mean [68]. As shown in the interaction plot in Figure

2, the curvilinear relationship between TMT tenure separation and TMT performance is stronger

when the level of behavioral integration is high. With higher levels of behavioral integration, the

positive relation between TMT tenure separation and TMT performance (the left part of the

curve) has been strengthened, while the negative relation between TMT tenure separation and

TMT performance (the right part of curve) has been worsened. Conversely, at low levels of

behavioral integration, the positive effect is weakened at lower levels of diversity while the negative social categorization effect is also weakened and turns positive for higher levels diversity. Thus, hypothesis 4 is supported.

Insert Figure 3 about here

V. DISCUSSION

A. Theoretical Implications

Prior research has yielded inconsistent findings on the effect of TMT diversity on TMT performance. Some find a positive relationship (e.g., [8]), while others find a negative relationship (e.g., [9]), and some yet no relationship (e.g., [10]). Many questions remain on how TMT diversity affects TMT performance. This study attempts to contribute to this literature by focusing on a specific attribute of TMT diversity – tenure diversity to delineate non-linear relationships between the two dimensions of tenure diversity and team performance with the incorporation of behavioral integration as a moderator. We examine the two processes of information processing and social categorization that have been identified by prior research to influence the relationship between diversity and performance. Drawing insights from Van Knippenberg et al. (2004) [11] and Harrison and Klein (2007) [6], we differentiate TMT tenure diversity into tenure variety and tenure separation, and investigate their influence on TMT performance while incorporating an important moderating mechanism—behavioral integration.

Our analysis provides strong support for a curvilinear relationship between TMT tenure diversity and team performance. However, the different types of diversity had different

(opposing) effects consistent with the team processes they affect. Specifically, TMT tenure diversity variety affects mainly the information processing process within the team and thus has mostly a negative effect, although at a declining marginal rate. Conversely, TMT tenure diversity separation affects mainly the social categorization process within the team and thus mostly has a negative effect. Furthermore, we found the relationship between team tenure separation and performance to be moderated by behavioral integration such that the negative effect of social categorization was also exacerbated at high levels of integration when team members interacted more and weakened at low levels of integration. We find that TMTs with high tenure variety have different information sources, which can generate divergent opinions and alternatives for solutions. Thus, both depth and breadth of strategic decisions by TMTs can be strengthened, resulting in decisions with high quality. In contrast, for TMTs with high tenure separation, social categorization processes dominate, highlighting differences between members in attitude and distance, which will result in conflicting ways to deal with issues and to complete tasks. This results in poor performance.

More interesting, neither the effect of tenure diversity variety nor tenure diversity separation on team performance is in linear. Although tenure diversity variety positively affects team performance, it does so at a diminishing marginal rate. That is, the incremental benefit of additional team variety declines with increasing variety. Our empirical results demonstrate that at a certain threshold, the coordination cost associated with incorporating an additional perspective on the TMT outweighs the information benefits such that the net effect is negative. That threshold is however so high that none of the TMTs in our sample met it.

Similarly, the effect of team tenure diversity separation on performance is also nonlinear. Although tenure diversity separation has a negative effect on team performance, it does so at an

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increasing rate. At lower levels of diversity separation, the negative effects of separation are weaker than at higher levels. Indeed, at very low levels, this effect is even positive. This is likely due to the fact that at minimum separation, all team members occupy the same position. There is perfect agreement within the team. One new TMT member (in a different category) will likely seek compromise than separation from the group. The TMT therefore gets the informational benefit on one more perspective without any of the separation costs. The positive marginal effect is only present a very low levels of diversity separation. In our sample only 7.9% of TMTs were below this threshold and thus experienced the positive marginal effect.

In all, our results help clarify the conflicting results of research examining the effect of TMT tenure diversity on performance. We show that the effect of diversity depends on the type of diversity as they affect different processes. Furthermore, we show how the opposing effects of both information processing and social categorization can occur simultaneously in the TMT. In addition, the effects of both processes are not linear. The level of diversity variety and diversity separation in a sample may affect the marginal effects found. Finally, behavioral integration moderates this effect, especially for tenure diversity separation. Future research can attempt to replicate these findings in different settings and countries to see if they are consistent.

B. *Managerial Implications*

This study also makes significant managerial implications, especially for engineering management. Our findings tell managers that in addition to their technical effectiveness, how well TMT members interact with each other also affects team performance. This is driven by the differences or similarities in team member attributes, especially demography. This paper focuses on how one such attribute – tenure diversity affects team performance. We find that tenure diversity affects team performance in two opposing ways. First, the variety in years that different

members joined the team means they bring perspectives from different time periods which enriches the information available for team decision making and thus improves performance. However, the gap or separation between years that different members joined the team makes it difficult for them to identify with each other thus reducing team cohesion and consequently performance. Interestingly, we find both of these effects can occur simultaneously making it difficult to know the net effect on performance. Furthermore, the current composition of the team determines what the effect of increasing tenure diversity would be. If the team already has variety, an additional team member who increases team variety would contribute less to team performance. Also, if there are already tenure gaps in the team, an additional team member who accentuates these gaps would have an even more deleterious effect on team performance. Finally we find that these effects are accentuated by how integrated the team when performing their tasks such that both positive effects of variety and negative effects of separation would be enhanced if the team is more integrated. Therefore, boards should therefore consider the current composition of their TMTs and how closely they would work together before deciding to increase or reduce the level of team tenure diversity.

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TABLES

Table 1

Descriptive Statistics of Sample Firms

Items	Categories	Quantity	Percentage
Firm age	< 3	7	5.52%
	3-5	12	9.53%
	6-10	40	31.78%
	>10	67	53.21%
Ownership	State-owned	36	28.64%
	Private	56	44.43%
	Foreign	23	18.32%
	other	11	8.67%
Size (number of employees)	< 50	18	14.30%
	50-100	19	15.12%
	101-300	24	19.01%
	301-1000	24	19.03%
	>1000	41	32.50%
Development stage	Introduction	12	9.51%
	Growth	53	42.14%
	Maturity	48	38.11%
	Decline	13	10.32%

Table 2

Descriptive Statistics of Top Managers

Items	Categories	Quantity	Percentage
Gender	Male	268	75.11%
	Female	89	24.89%
Age	26-30	33	9.21%
	31-35	79	22.08%
	36-40	85	23.78%
	41-45	89	24.89%
	>45	71	19.89%
Education level	Lower than college	25	7.01%
	College	48	13.42%
	Undergraduate	204	57.11%
	Masters	59	16.54%
	Ph.D.	21	5.89%
Functional background	Manufacturing	220	43.7%
	R & D	45	8.9%
	Accounting	51	10.1%
	Marketing	115	22.8%
	Law	1	0.2%
	Administration	49	9.7%
	Government officials	2	0.4%
	Other	21	4.2%
Tenure	<3 years	107	30.01%
	3-10 years	98	27.53%
	10-20 years	130	36.44%
	>20 years	22	6.21%

Table 3a   Factor loadings and coefficient alpha of behaviroal integration and team performance

Factors	Items	Loading	Cornbach's α
Behavioral integration	1) quantity and quality of information exchange,	0.80	0.79 (Cumulative % of extraction sum is 70.78%)
	2) the level of cooperative behavior,	0.87	
	3) joint decision-making.	0.86	
TMT performance	1) Efficiency,	0.78	0.80 (Cumulative % of extraction sum is 62.73%)
	2) Quality,	0.75	
	3) Technical innovation,	0.79	
	4) Work excellence.	0.85	

Table 3b   Factor loadings and coefficient alpha of the three sub-constructs of behavioral ingretation

Factors	Items	Loading	Cornbach's α
Quantity and quality of information exchange.	1) when a team member is busy, other team members often volunteer to help manage the workload;	0.85	0.79 (Cumulative % of extraction sum is 70.17%)
	2) team members are flexible about switching responsibilities to make things easier for each other;	0.82	
	3) team members are willing to help each other complete jobs and meet deadlines.	0.84	
The level of cooperative behavior.	1) team members can compare ideas regularly;	0.80	0.76 (Cumulative % of extraction sum is 67.46%)
	2) during the discussion, team members can put forward qualified solutions;	0.86	
	3) through the communication, team members can produce high level of creativity and innovation.	0.81	
Joint decision-making.	1) team members usually let each other know when their actions affect another team member's work;	0.82	0.76 (Cumulative % of extraction sum is 67.14%)
	2) team members have a clear understanding of the joint problems and needs of other team members;	0.81	
	3) team members usually discuss their expectations of each other.	0.83	

Table 4
Descriptive Statistics Bivariate Correlations

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Firm age	2.53	1.15	1											
2. Firm size	3.40	1.44	.45**	1										
3. Ownership structure	2.05	0.88	.24**	-.129	1									
4. Age diversity	0.53	0.14	.06	.17	-.03	1								
5. Diversity of educational background	0.42	0.21	-.19*	-.15	-.12	-.05	1							
6. Diversity of functional background	0.55	0.18	-.12	-.01	-.00	.18*	.10	1						
7. Industry (High-tech)	1.19	0.39	.06	.13	.23*	.03	-.12	.09	1					
8. Tenure disparity	0.92	0.39	.14	-.00	-.12	.06	-.21*	-.12	-.06	1				
9. Tenure variety	0.51	0.12	.19*	.14	-.01	.16	-.15	.17	-.02	.25**	1			
10. Tenure separation	3.92	2.27	.32**	.16	-.19*	.17	-.27**	-.14	-.09	.42**	.40**	1		
11. Behavioral integration	3.80	0.58	-.05	-.04	-.05	-.15	.03	-.08	-.08	-.08	-.07	-.16	1	
12. TMT performance	3.65	0.74	.09	.11	-.02	.10	-.11	.03	.12	.23**	.43**	.24**	.25**	1

* $p < .05$
** $p < .01$
*** $p < .001$

Table 5

Results of Hierarchical Regressions

Variables	TMT Performance						
	Model 1 (Controls)	Model 2 (First-order)	Model 3 (Second-order)	Model 4 (Interaction)	Model 5 (First-order)	Model 6 (Second-order)	Model 7 (Interaction)
Controls							
Firm age	0.01 (0.07)	-0.02 (0.06)	-0.04 (0.05)	-0.03 (0.05)	-0.01 (0.06)	-0.03 (0.06)	-0.01 (0.06)
Firm size	0.04 (0.05)	0.02 (0.05)	0.02 (0.04)	0.02 (0.04)	0.03 (0.05)	0.01 (0.05)	0.01 (0.05)
Ownership structure	-0.01 (0.08)	-0.02 (0.07)	-0.00 (0.06)	-0.00 (0.06)	0.03 (0.08)	0.02 (0.07)	0.01 (0.07)
Age diversity	0.34 (0.47)	0.35 (0.42)	0.50 (0.36)	0.51 (0.37)	0.40 (0.45)	0.37 (0.44)	0.36 (0.44)
Diversity of educational background	-0.12 (0.33)	0.02 (0.29)	-0.02 (0.25)	-0.03 (0.26)	-0.01 (0.31)	0.14 (0.31)	-0.01 (0.31)
Diversity of functional background	0.14 (0.37)	-0.13 (0.33)	0.10 (0.29)	0.09 (0.29)	0.31 (0.35)	0.15 (0.35)	0.01 (0.35)
Industry(High-tech)	0.23 (0.17)	0.33* (0.15)	0.23† (0.14)	0.23† (0.14)	0.30† (0.17)	0.38* (0.17)	0.41* (0.17)
Tenure disparity	0.17* (0.07)	0.12† (0.06)	0.07 (0.05)	0.06 (0.05)	0.14† (0.07)	0.11 (0.07)	0.09 (0.07)
First-order terms							
Tenure variety		0.31*** (0.06)	0.22*** (0.06)	0.21*** (0.06)			
Tenure separation					0.17* (0.07)	0.34** (0.11)	0.32** (0.10)
Behavioral integration		0.24*** (0.06)	0.25*** (0.05)	0.26*** (0.05)	0.25*** (0.06)	0.26*** (0.06)	0.38*** (0.08)
Second-order terms							
Tenure variety^2			-0.13*** (0.02)	-0.12*** (0.02)			
Tenure separation^2						-0.10* (0.04)	-0.11** (0.04)
Interaction terms							
Behavioral integration× Tenure variety				0.01 (0.06)			
Behavioral integration× Tenure variety^2				-0.01 (0.03)			
Behavioral integration× Tenure separation							0.19* (0.09)
Behavioral integration× Tenure separation^2							-0.12* (0.05)
R^2	0.09	0.32	0.50	0.50	0.22	0.25	0.29
Adjusted-R^2	0.03	0.26	0.45	0.44	0.15	0.18	0.21
F-value	1.42	5.47***	10.20***	8.50***	3.19**	3.47***	3.52***
ΔR^2		0.23***	0.17***	0.00	0.13***	0.03**	0.040*
Max VIF	1.37	1.40	1.40	1.63	1.46	3.05	3.08

* p < .05
** p < .01
*** p < .001