Industrial Marketing Management 126 (2025) 197–209

Contents lists available at ScienceDirect

Industrial Marketing Management

journal homepage: www.elsevier.com/locate/indmarman

Top management team means-ends diversity and competitive dynamics

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ARTICLE INFO

Keywords:
Means-ends diversity
Competitive propensity
Organizational slack
Strategic investment
Top management team

ABSTRACT

We examine how top management team (TMT) members' disagreement about strategic means and ends – means-ends diversity (MED) – affects firms' propensity to take competitive action in the context of fungible versus non-fungible resources. Theorizing in part from TMT diversity literature, we contribute to competitive dynamics and upper echelons research by demonstrating how top team MED shapes competitive outcomes. Contrary to common assumptions, our results suggest that such diversity can inhibit rather than promote competitive propensity. Importantly, we argue that firm resource profiles are pivotal in moderating this relationship. To be specific, we find that multipurpose fungible resources like slack augment this suppression, whereas non-fungible strategic investments galvanize action and do the opposite. Moreover, we find that too weak and too great a propensity for competitive action diminishes firm performance. Theoretical contributions and research implications are discussed.

1. Introduction

Drivers of strategic action are focal to strategic management research. The competitive dynamics literature addresses the topic by studying how firms engage with rivals through a series of actions and responses to pursue competitive advantage (Chen, 1996; Chen et al., 1992). Drawing on the Austrian school of economics (Jacobson, 1992), competitive dynamics scholars argue that firms compete both proactively and in response to rivals (Chen et al., 1992; Porter, 1980), demonstrating how collective behavior by top executives shapes these competitive decisions (Chen et al., 2010; Chen et al., 2021; Ferrier, 2001; Hambrick et al., 1996). After all, it is key decision makers – specifically the top management team (TMT) – rather than firms in the abstract that make strategic decisions (Finkelstein et al., 2009; Hambrick & Mason, 1984; Krieweth et al., 2024).

Research on strategic decisions argues that the collective characteristics of the TMT influence strategic choices, specifically that cognitive and social processes among top executives are critical to their joint decision-making (Bromiley & Rau, 2016; Hambrick, 2007). For example, contrasting perspectives and priorities among TMT members may cause divergence in strategic direction (Kilduff et al., 2000; Miller et al., 1998; Wang et al., 2019).

Research on TMT diversity has tended to focus on either proximal outcomes such as interpersonal relations or those indirect like firm performance (Miller et al., 2022; Samba et al., 2018). There is limited investigation, however, into the impact of diversity on strategic action (Miller et al., 2022). Building on research on competitive dynamics and TMT diversity, we study how and under which circumstances disagreement among TMT members about core strategic means and ends – means-ends diversity or MED – influences competitive actions, and ultimately, firm performance.

In an early attempt to link the two streams, Hambrick et al. (1996) showed that TMT *demographic* heterogeneity produced more abundant competitive actions. Unfortunately, as TMT diversity was measured by demographics, interpretation of the results is difficult as diversity in different demographics may affect competitive behavior differently – bearing positive, negative, or non-significant effects. For example, whereas TMT educational heterogeneity is positively related to competitive action propensity, it is negatively related to execution speed and response propensity (Hambrick et al., 1996). Moreover, demographic differences, although potentially important, do not reveal the underlying understandings and priorities of decision makers –

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https://doi.org/10.1016/j.indmarman.2025.02.015
Received 28 March 2024; Received in revised form 14 January 2025; Accepted 15 February 2025
Available online 24 February 2025

orientations that ultimately drive decisions (Nadkarni & Barr, 2008; Olson et al., 2007).

To explore the latter, we examine how competitive behavior is shaped by TMT diversity in strategic means and ends – how much members disagree in their beliefs and preferences for the organization (Miller et al., 1998). A key dimension of competitive behavior is *competitive propensity* – firms' tendency to initiate and respond to competitive attacks to achieve or protect advantages (Hambrick et al., 1996). Our thesis is that the impact of TMT MED on competitive actions is conditioned in opposite ways by two contrasting types of resources: fungible and non-fungible (Chen, 1996; Sirmon et al., 2008). Fungible resources such as organizational slack can reduce the urgency to make a decision and provide a buffer to TMT members, allowing their disagreement to delay competitive action (Mishina et al., 2004; Penrose, 1959). It reduces the immediate need to address competitive challenges, thereby strengthening a suppressive effect of TMT MED. In direct contrast, non-fungible resources, those already committed and in the form of investments for strategic development, can guide and thus facilitate proactive competitive behavior despite team diversity. Such resources help to enact a long-term strategic vision that may provide the direction to orchestrate strategic thinking towards compromise and thereby facilitate action. To summarize, whereas non-fungible strategic investments may offset the constraints of TMT diversity, fungible organizational slack enhances these constraints, thereby promoting stagnation.

Our research makes several contributions. First, we provide insight into competitive dynamics by showing how TMT member disagreement about means and ends influences competitive propensity. In incorporating human agency in the form of MED, we go beyond conventional industry and organizational factors to offer a finer-grained lens into the micro-foundations of actual competitive behavior (Chen & Miller, 2015; Marcel et al., 2010). Moreover, we do so by studying *actual competitive behavior,* a core concern of competitive dynamics, rather than only competitive *conceptualization* (as did Miller et al., 1998).

Second, we theorize about a more specific concept, MED, avoiding the heterogeneous notion of TMT diversity and heterogeneity that has had divergent and sometimes blurred meanings across studies. This contributes to the study of upper echelon behavior by examining the influence of a more precise construct (Hambrick, 2007).

Third, we demonstrate that the effect of MED on competitive action propensity very much depends on the resource context. Specifically, we find that *fungible slack resources* can discourage rather than spur action: diverse TMTs can avoid engaging in rivalry when their firms are buffered by slack resources. By contrast, *non-fungible resources* in the form of committed strategic investments can galvanize competitive action, capturing attention and providing vision and guidance that counters the suppressive effect of diversity. These contrasting effects add nuance to our understanding of competitive dynamics and in the presence of top team diversity.

In short, we contribute to both competitive dynamics and upper echelons literatures. The first by focusing on top team drivers of concrete competitive action, the second by going beyond remote demographic proxies for TMT heterogeneity (e.g., Ferrier & Lyon, 2004; Hambrick et al., 1996), opening up the "black box" via the more precise MED (Bromiley & Rau, 2016; Miller et al., 2022). Moreover, by examining the moderating impact of two types of resources, we further address ambiguities relating to the consequences of TMT heterogeneity (van Knippenberg & Mell, 2016; Wei & Wu, 2013). Finally, our research provides insights into the mechanisms through which TMT diversity influences firm performance (Hambrick, 2007; Samba et al., 2018).

2. Theoretical background

2.1. Competitive dynamics and competitive propensity

Competitive dynamics focuses on firm competitive behavior via the interplay of action and response (Chen, 1996; Chen et al., 1992). It also proposes the importance of TMTs in guiding competitive interaction (Chen et al., 2010; Hambrick et al., 1996). For example, Hambrick et al. (1996) find that TMT demographic heterogeneity promotes proactive behavior but diminishes competitive response. Chen et al. (2010) contend that TMT *socio-behavioral integration* – the degree to which TMT members work together as a team – is a critical determinant of environmental assessment and strategic choice. The study of TMT socio-behavioral integration brings into focus top team characteristics shaping interaction and cohesion in decision-making. Yet, we still know little about how a lack of such integration, for example when TMT MED is present, affects firm competitive behavior.

A different strand of research suggests that the environments in which firms operate shape the interpretations of managers, who develop simplified representation of competitive behavior, and enact those perspectives via strategic choices (Porac & Thomas, 1990). Simply put, strategic decision makers adopt simplified, often biased, mental models that convert complex real-world problems into more manageable "small-world" problems (Kilduff et al., 2000; Menon, 2018). This lens has been employed in examining competitive groups (Porac & Thomas, 1990), managerial attention (Eggers & Kaplan, 2009), and TMT temporal dispositions (Nadkarni et al., 2016). For example, Nadkarni et al. (2016) contend that executive temporal depth – time horizons that executives consider when contemplating past and future events – shapes firm competitive aggressiveness.

Firms compete in a market, working to gain advantage over rivals via active competitive initiatives (Chen & Miller, 1994; Porter, 1980). In this research, we assess such *competitive propensity* – the number of attacks a firm initiates against other firms as well as its responses to the attacks of rivals (Chen et al., 1992; Hambrick et al., 1996). Competitive propensity enables firms to seize new opportunities and limit rival advantage. By employing more and frequent actions and responses such as market entry and expansion, new product introductions, or alliances, firms can enhance their competitive position (Chen & Miller, 1994; Ferrier, 2001). According to Eisenhardt (1999: 65), "the ability to make fast, widely supported, and high-quality strategic decisions on a frequent basis is the cornerstone of effective strategy."

Although insightful work has delved into TMT attributes, we still have limited knowledge on how TMT diversity affects competitive behavior, thereby constraining our understanding of *why* and *how* firms differ in strategic choices and performance.

2.2. TMT means-ends diversity

Research in social psychology highlights how teams' capacity to collaborate effectively and work efficiently towards achieving organizational goals drives success (Cannon-Bowers et al., 1993; West & Anderson, 1996). TMTs often have a shared understanding through which they make strategic decisions (Cyert & March, 1963; Hambrick & Mason, 1984). Hambrick (2007: 334) stresses that "leadership of a complex organization is a shared activity, and the collective cognitions, capabilities, and interactions of the entire TMT enter into strategic behaviors."

However, when top managers do not share similar views about means and goals, such diversity is potentially consequential (Smith & Tushman, 2005; see Appendix A for a summary of related diversity research). TMT MED refers to differences in beliefs and preferences held by firm executives regarding strategic means and ends (Miller et al., 1998). It captures the "variation in beliefs concerning cause-effect relationships and variation in preferences concerning various goals for the organization" (Miller et al., 1998: 41). It also serves as a lens through which members perceive team tasks and interactions (Miller et al., 2022; van Knippenberg & Mell, 2016). Such disagreement can represent lasting differences in viewpoints that influence the strategies teams employ to achieve desired outcomes (Olson et al., 2007). Accordingly, TMT MED reflects variation in members' representations of strategic issues – how they evaluate competitive situations, approach different challenges, and

interpret and respond to competitive forces (Kilduff et al., 2000; Miller et al., 1998).

Top teams comprising members with different means and goals beliefs and priorities have the potential to provide varying strategic perspectives and make decisions in a more comprehensive and multifaceted way (Eisenhardt et al., 1997; van Knippenberg & Mell, 2016). While such diversity may increase the amount of information considered, it can result in misunderstandings among members (March, 1991). Diverse preferences and beliefs may also prevent team members from sharing, discussing and integrating information, ideas and insights (Miller et al., 1998; van Knippenberg & Schippers, 2007), thereby inhibiting information elaboration when managers defend their positions rather than engage in open exchanges (De Dreu & van Knippenberg, 2005; Samba et al., 2018). Moreover, disagreement in preferences and beliefs may produce dysfunctional relationships, which can harm the quality of strategic decisions and performance (Amason & Sapienza, 1997; Eisenhardt et al., 1997).

Although some research focuses on the impact of TMT MED on team behavior and processes, little attention has been devoted to how it influences competitive behavior – observable actions firms take to compete with rivals (Miller et al., 2022; van Knippenberg & Mell, 2016). We believe MED will indeed affect competitive action, which in turn can have key performance implications. Our integration of these domains provides a sharper, more nuanced understanding of the strengths and weaknesses of TMT diversity and competitive behavior.

2.3. The moderating impact of fungible versus non-fungible resources: Slack versus strategic investment

We explore two forms of resources, fungible and non-fungible, as opposite moderating conditions of the relationship between TMT MED and competitive propensity. The first includes organizational slack, which reduces the urgency to decide on competitive actions; the second are strategic investments which guide and orchestrate action. The effects of MED on competitive action will vary depending on the relative balance between fungible and non-fungible resources (Mannor et al., 2016). Specifically, slack resources reduce the urgency to act and fund alternative action options to fuel disagreement that stymies action. By contrast, resources committed to strategic investment provide strategic direction and reflect vision, thereby galvanizing agreement and the ability to act.

Fungible resources, by definition, can be used for very different competitive initiatives or for delaying initiatives. Slack resources can reduce decision urgency, allowing disagreements to persist and thus paralyze action as the organization has enough financial resources and other assets to sustain inertia (Miller, 1993). TMT members who disagree can simply delay taking action as the survival of the firm is less likely to be severely threatened by rival initiatives or changes in the market.

By contrast, non-fungible or committed resources in the form of a clear and active trajectory of strategic investment indicates that a firm has a sharp and lucid strategic vision: it has identified and is in the pursuit of core goals and objectives. In such circumstances, team members are able to rally around those objectives, despite their disagreements, and are less likely to inhibit the propensity to take competitive actions (Bradley et al., 2011; Mishina et al., 2004; Penrose, 1959). Thus, we propose two moderating conditions: slack resources and core strategic investments, each with diametrically opposite effects on the association between TMT MED and competitive propensity.

In the next section, we develop arguments on the direct relationship between TMT MED and competitive propensity. We also elaborate on this relationship by examining the conditioning influence of two important types of resources: organizational slack and strategic investment. Fig. 1 depicts our conceptual model.

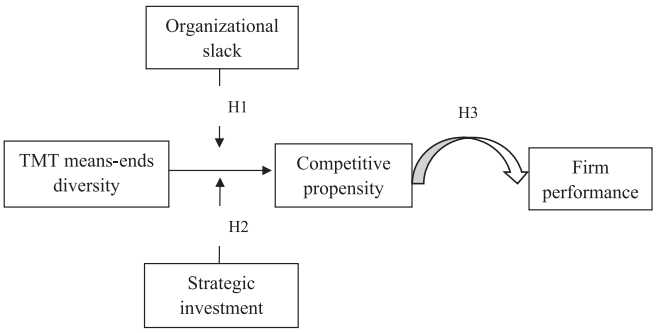

Fig. 1. Conceptual model of study.

3. Hypothesis development

3.1. TMT means-ends diversity and competitive propensity

TMT diversity has received much attention, with some scholars arguing for positive and others negative impacts. Research that underscores the advantageous effects of team diversity views it as expanding the reservoir of resources (van Knippenberg & Schippers, 2007). Diversity is seen to help synthesize insights, boost team creativity (Shin et al., 2012), aid in problem-solving, innovation, and information processing (Van der Vegt & Janssen, 2003; Wei & Wu, 2013), and improve outcomes (Miller et al., 2022).

Prior research studying demographic heterogeneity in top team age, tenure, education, and functional backgrounds, suggests that these boost competitive propensity and performance. Hambrick et al. (1996) find that such TMT demographic heterogeneity spurs action because it broadens information gathering and induces more creative and bolder decision-making. Top executives bring rich experiences and diverse information systems to the TMT, and their interaction may create a wealth of strategic alternatives (Hambrick & Mason, 1984). Diverse experiences and perspectives may lead TMT members to challenge one another, and the potential for constructive conflict within a heterogeneous TMT may bring into focus a small set of appropriate actions or a simple strategic repertoire (Miller, 1993).

On the other hand, other research suggests that TMT MED is detrimental to strategic decisions and subsequent performance (Miller et al., 1998; Simsek et al., 2005). In a meta-analysis, Samba et al. (2018) find that contrary to conventional thinking in strategy, strategic dissent on the TMT not only disrupts interpersonal relations but inhibits information sharing, elaboration, and assimilation, thereby eroding the quality of decisions and performance. This accords broadly with Mintzberg et al.'s (1976) notion that strategic decision-making is influenced by "soft" factors like emotions, politics, power, and personality. When these factors are involved, TMT MED may hinder decision-making. In other words, the assumption that heterogeneous TMTs engage in more thorough or productive strategic discussions ignores the emotions and conflict that may arise from means-ends disagreement and its hobbling of decision processes.

Cronin and Weingart (2007) argue that diversity influences three core processes in teams: information processing, coordination, and conflict management. It may disrupt information processing by leading to misunderstandings and misuse of information (McGrath & Argote, 2001) and may inhibit coordination by generating inconsistencies in problem resolution, leading to conflicting actions (Cronin & Weingart, 2007). When team members differ in their interpretation of information and their understanding of a problem and solution, they are likely to experience conflict, which will lead to lower-quality decisions and impair the ability to take action (Cronin & Weingart, 2007; Hambrick et al., 1996; McGrath & Argote, 2001). Inconsistencies in members' means-ends representations are thus fundamental to many decision-making problems encountered by a TMT (Menon, 2018; Miller et al.,

1998).

A TMT with high MED is likely to expend more time on discussion before agreeing on strategic choices (Miller et al., 2022; Nadkarni & Barr, 2008). Top managers, however, often have limited time to deliberate thoroughly and must rely on TMT cooperation and agreement on key information (Cannon-Bowers et al., 1993). As such, a TMT in disagreement may slow or prevent competitive action (Miller et al., 1998; Nadkarni & Barr, 2008). For example, Nadkarni and Barr (2008) suggest that such diversity can produce ambiguity and conflict that inhibit both the timeliness and quality of strategic actions.[1]

This research focuses on MED and its impact on competitive action. Because related research has been inconclusive on the consequences of TMT disagreement, we propose that such impact can be positive or negative, depending on the moderating effects of two types of resources: fungible organizational slack and non-fungible strategic investment. Below, we argue how these factors drive the diversity-competitive action relationship in opposite ways.

3.2. Moderating role of fungible resources: Organizational slack

Organizational slack, which represents a firm's stock of re-deployable resources, has received much attention in competitive dynamics research. Research has posited a positive role for slack in driving competitive behavior because having more slack resources may enable firms to identify and react to competition (Carnes et al., 2019; Ferrier, 2001). Slack can make available to managers more resources to deploy in competitive rivalry. It also may ease tensions among TMT members because abundant resources can address more of their individual demands (Cyert & March, 1963; Miller et al., 2022).

Contrary to conventional thinking, however, we argue that fungible resources like slack can reduce the urgency and pressure to come to a decision: they protect the firm from the immediate need to act and respond, and hence facilitate delay. Slack provides an excuse to not act as well as a bank of resources that can serve divergent purposes, and thus be an object of dispute in a diverse team. Although slack may provide resources to pursue different goals, that pursuit may be discouraged to avoid an unprofitable discordant strategy. In addition, deploying slack requires more bargaining, planning, and time (Mishina et al., 2004), potentially distracting TMT members from external challenges (Voss et al., 2008). In short, slack will strengthen a negative effect of TMT MED on competitive propensity. Specifically, for a diverse TMT to act, it must work through and reconcile disagreement and divergent beliefs, and slack can fund disparate options that fuel debate. It also serves as a resource buffer that reduces the urgency and thus impetus to reconcile differences and act (Kim & Bettis, 2014). The firm can afford to delay action. Thus, with more slack, a diverse TMT will reduce the propensity to take competitive action.

Hypothesis 1. The negative effect of TMT MED on competitive propensity is stronger when organizational slack is high than when it is low.

3.3. Moderating role of non-fungible committed resources: Strategic investment

Whereas resource abundance in the form of fungible slack resources can delay decisions, non-fungible strategic resources, by contrast, can galvanize and facilitate decision making. Resources in the form of strategic investments, often geared towards firm growth, are critical for long-term performance (Eisenhardt, 1999; Porter, 1980). They generate future value and reflect agreement on strategic direction (Benner & Ranganathan, 2012). Strategic investments have several key characteristics. They commit substantial resources and are difficult to implement and alter (Hambrick et al., 1996). In addition, investments such as research and development (R&D) are future-oriented and intended to improve long-term competitiveness (Benner & Ranganathan, 2012). Because strategic investments do not usually yield immediate or certain returns (Benner & Ranganathan, 2012), firms must also engage in ongoing competitive initiatives to complement those investments and maintain or build market position (March, 1991; Miller & Chen, 1996).

Importantly, strategic investments clarify strategic vision and direction, thereby helping to overcome the drawbacks of TMT MED. A well-defined long-term strategic vision serves as a compass to guide the collaborative efforts of diverse team members. By outlining a clear path forward and delineating specific objectives, strategic investments foster a shared understanding of a team's purpose and desired outcomes (Eisenhardt, 1999). This shared purpose, in turn, provides a common ground for TMT members to come together, engage in productive dialogue, and resolve disagreements (Cannon-Bowers et al., 1993; Eisenhardt et al., 1997). Moreover, clear strategic direction can facilitate coordination of action by aligning diverse talents and skills towards a unified goal (Miller et al., 2022). It fosters a sense of unity and cooperation, thereby reducing disputes due to misunderstandings or conflicting priorities, and orchestrating competitive action (Olson et al., 2007; Pieterse et al., 2011).

Finally, the negative impact of TMT MED on competitive propensity will be decreased by strategic investment because it motivates the team to align current competitive actions with long-term strategic direction. In short, strategic investments strengthen the link between strategic goals and immediate actions, decreasing the negative impact of TMT diversity on competitive behavior.

Hypothesis 2. The positive effect of TMT MED on competitive propensity is stronger when firm strategic investment is high than when it is low.

3.4. Competitive propensity and firm performance

Research on competitive dynamics has studied the impact of competitive actions on performance. Despite the widely held view that competitive actions improve performance, empirical findings have been equivocal. Some studies find a positive relationship between performance and competitive propensity (e.g., Chen et al., 2010; Nadkarni et al., 2016), while others suggest a negative one (e.g., Andrevski & Miller, 2022; Porter, 1980). The former argue that a firm that tends to act frequently and speedily is likely to capture business opportunities, preempt rivals, and facilitate learning. The latter find that too many competitive actions may invite retaliation from competitors, increase costs, reduce the potential for learning, and incur operational inefficiencies.

To reconcile these findings, recent research suggests a non-linear relationship between competitive action and performance. Andrevski and Ferrier (2019) find that competitive aggressiveness and performance have an inverted-U relationship. Firms benefit from an initial increase in aggressiveness, having the time and resources for timely defence and initiatives, strategic renewal, and competitive positioning. After a point, however, too much aggressiveness increases costs and erodes performance (Andrevski & Miller, 2022; Dierickx & Cool, 1989).

Based on this research, we argue similarly that competitive propensity has a non-linear (inverted U-shaped) relationship with performance. At first, firms benefit from competitive actions that renew product market efforts and defend against competition. However, at very high levels, the costs become onerous and the chances of mistakes increase. Executing too many competitive actions taxes financial and managerial resources and leads to blunders (Dierickx & Cool, 1989; Pacheco-de-Almeida, 2010); it also can cut productivity and inflate costs

[1] In addition, prior research on the impact of TMT heterogeneity on competitive action focuses on demographic heterogeneity, not MED, the latter tying more directly to decision making. When TMT diversity is measured by demographics, interpretation of the results is difficult as connections with competitive behavior are indirect and potentially variable.

(Pacheco-de-Almeida, 2010). And it creates problems of coordination and information overload (Andrevski & Ferrier, 2019; Pacheco--de-Almeida, 2010). To summarize, too little or too much competitive propensity will erode performance whereas a moderate level of competitive propensity will avoid these shortcomings, enhancing performance by leveraging the benefits of competitive action and avoiding the substantial costs.

Hypothesis 3. Competitive propensity has an inverted-U-shaped effect on firm performance, such that moderate competitive propensity leads to higher performance than low or high competitive propensity.

4. Method

4.1. Sample and data collection

We drew our sample from 1872 publicly listed firms in Taiwan for the fiscal years 2013–2018 inclusive. To assess TMT MED, we surveyed top-level executives in 2014 to collect primary data. We first developed a questionnaire in English, then two professional translators translated it into traditional Chinese, followed by back-translation. Translators discussed inconsistencies until agreement was reached. We invited twelve business executives to evaluate face and construct validity of the survey items in a pilot test and, based on their feedback, we modified the wording of the questionnaire.

Before sending out the survey, we obtained contact information for the chief executive officers (CEOs) or general managers (GMs) of all 1872 firms and sent them a letter inviting them to participate in the research. A cover letter and several questionnaires were posted two weeks later; we asked the CEOs or GMs to distribute the questionnaires to their TMT members who work closely with them and hold significant decision-making authority regarding the firm's strategic direction. Prepaid envelopes were included to make it easier for potential respondents to return the completed questionnaire.

To reduce single-response bias, we included only firms with more than one completed survey (Carmeli & Schaubroeck, 2006; Chen et al., 2010). After several rounds of follow-up, we obtained 448 completed surveys from 168 firms. We dropped firms that lacked archival information and obtained 366 surveys from 135 firms to form our sample. We compared early and late responses on key variables using a *t*-test and found no statistical differences between the two groups. We also compared responding and nonresponding firms on firm size, age, and industry, and found all t-statistics to be nonsignificant.

Out of a total 366 respondents, 62 were identified as CEO, GM, or president, 75 as deputy GM, and 205 as division head, with some holding multiple positions including chief finance officer, chief operating officer, and chief marketing officer. Given that job titles vary depending on the organizational structure, 24 chose "other positions" (e.g., chairman assistant). When classified by divisions, 67 were responsible for overseeing all divisions, 131 managed two or more divisions, 26 were from finance, 48 from marketing, 32 from R&D, 34 from manufacturing or engineering, and 28 fell into other top divisions (e.g., strategic investment). The average tenure of the TMT members was 15.2 years, and the average age was 48.7. Thus, the respondents had ample experience and knowledge of the firm. The average firm size was 1522 employees, and the average firm age was 32.3 years. Our sample firms were from various industries, including machinery, telecommunications, food products, and others. Manufacturing firms accounted for 81.5 %, and the remainder were services. Medium-high-tech, high-tech, and service firms accounted for three-quarters of our sample, which is representative of the structure of industries in Taiwan.[2]

4.2. Measures

4.2.1. Dependent variable

Following convention in competitive dynamics research, we used media articles in Factiva to measure competitive propensity. Competitive propensity is measured as the total number of actions (and responses) of a firm in 2015. We employed structured content analysis to identify the competitive actions that sample firms took in their home market (Chen & Miller, 1994). First, drawing from research on competitive dynamics, we developed an initial list of key words (translated from English into traditional Chinese) that indicate competitive activities. Second, we read and coded a representative sample (100) of the news articles in Chinese published by Factiva. From this reading, we generated a revised list of key words. We then asked three industry experts in Taiwan – a CEO from a management consultancy, a strategy scholar, and a business journalist – to provide feedback on our list and, based on their comments, added a few words in traditional Chinese. We then generated a final list of key words (e.g., "competition," "price cut") that characterize competitive activities. Finally, we searched all Factiva articles from January to December 2015 that mentioned our sample firms and included at least one key word in the article title or headline. The one-year time lag between our measure of TMT MED and competitive propensity helps allay concern about reverse causality.

After we removed duplicate announcements of the same action, our search provided us with 877 news articles. We then read each article and identified 754 firm-level competitive actions. In case more than one competitive action was included in an article, we recorded the actions separately. We categorized each competitive action into one of nine action types: product action; marketing action; pricing action; capacity action; improvement in distribution and after-sales service; major change in business strategy; merger and acquisition, alliance formation and cooperation with others; changes in organizational structure and management systems; and market expansion. Two coders coded the articles independently and reached an agreement of more than 80 % on action categorization. All discrepancies were discussed and ultimately agreed upon by the two coders.

We measured firm performance via three-year (2015 to 2017) average return on assets (ROA) and three-year average net profit margin (NPM) (Chen et al., 2010; Ndofor et al., 2011). We assessed both ROA and NPM as they reflect different aspects of performance, providing broader insight into the impact of competitive actions (Hambrick et al., 1996). Three-year averages reduced volatility from yearly fluctuations, providing a more representative reflection of the performance trajectory (Chen et al., 2010; Subramaniam & Youndt, 2005). It also allows enough time for competitive actions to take effect. As our firms operate in different industries that vary in financial structure and performance dynamics, assessing both ROA and NPM helps to take into account that variety.

4.2.2. Independent variables

We employed financial index as a proxy for (fungible) organizational slack and measurement items to capture (non-fungible) strategic investment and TMT MED (see Appendix B). We measured TMT MED via respondent assessments of top team member differences in beliefs about and preferences for firm goals and strategies using a four-item measure adapted from Miller et al. (1998). One of the items relates to preference diversity and three to cause-effect diversity. A 7-point Likert scale (1 = "strongly disagree," 7 = "strongly agree") was used whereby the more

[2] https://www.moea.gov.tw/MNS/dos_e/home/Home.aspx.

agreement among TMT members, the less the diversity.[3] Thus, we reverse-coded to create our measure.

Organizational slack was measured by the negative of the debt to total assets ratio; so the higher the number, the more slack (Kim & Bettis, 2014). It represents the availability of unabsorbed financial resources to be used for strategic actions (Carnes et al., 2019), thus providing scope for managerial discretion (Bradley et al., 2011). We measured strategic investment via respondent assessments of targeted investment in strategic domains. One such investment is future oriented R&D (Benner & Ranganathan, 2012) which represents capital expenditures towards firm growth. Other strategic investments are in human capital (e.g., sales training), internal management systems (e.g., knowledge management), and operations process improvement (e.g., distribution channel development). A four-item measure was used, again rated on a 7-point Likert scale.

4.2.3. Control variables

We controlled for TMT demographic characteristics, including its size, and heterogeneity in members' age, tenure, education, and function. TMT size is the number of people on the team. TMT age heterogeneity and tenure heterogeneity were assessed via the coefficient of variation in member age and tenure, respectively. TMT educational heterogeneity was measured using a variant of the Herfindahl–Hirschman index, calculated as $H = 1 - \sum_{i=1}^{n} S_i^2$, where H is the heterogeneity measure and Si is the percentage of TMT members in each of three educational categories (i.e., below undergraduate degree, undergraduate degree, and postgraduate degree). A similar index was used to measure TMT functional heterogeneity based on nine functional background categories – general management, operations, R&D, finance, personnel, manufacturing/engineering, marketing/customer service, accounting/controller, and others.

At the firm level, we controlled for firm age and size. Firm age is the natural logarithm of the total number of years in business. Firm size is the natural logarithm of the total number of full-time employees. We also controlled for past performance using ROA (t-1) and NPM (t-1) because they can influence competitive behavior. Finally, we controlled for industry using the five OECD classifications: high-tech manufacturing, medium-high-tech manufacturing, medium-low-tech manufacturing, low-tech manufacturing, and services.

4.3. Data aggregation and interrater reliability

We surveyed individual TMT members on beliefs and preferences towards means and ends, and strategic investment, and aggregated that individual data into team- and firm-level scores. To assess the suitability of this aggregation, we computed interrater agreement (R_{wg}), two intraclass correlation (ICC) coefficients, and an F test for ICC (1). The results show that the average R_{wg} values for TMT MED and strategic investment are 0.96, and 0.95, respectively. All teams have R_{wg} values greater than the 0.70 benchmark, which indicates a satisfactory level of intermember agreement within teams. ICC (1) is 0.43 ($F = 3.06$, $p = 0.00$) for TMT MED, and 0.56 ($F = 4.39$, $p = 0.00$) for strategic investment, all greater than the conventional cutoff value of 0.12. The results indicate that between-team variances are greater than within-team variances. ICC (2) is 0.72 for TMT MED and 0.77 for strategic investment, all greater than the conventional cutoff value of 0.70. Thus, it was acceptable to average individual team member scores to compute those at team- and firm-levels.

4.4. Analytical techniques

To test our hypotheses, we employed hierarchical regression analysis. To assess the interaction effect of TMT MED, organizational slack, and strategic investment on competitive propensity, we mean-centered the three predictor variables and constructed two interaction terms: TMT MED × organizational slack; and TMT MED × strategic investment. To explore the potential curvilinear effect of competitive propensity on firm performance, we introduced a squared term by multiplying competitive propensity with itself.

We also employed multiple diagnostic procedures to assess modeling assumptions. To verify univariate normality, we conducted a Kolmogorov-Smirnov test, obtaining support. We also performed a full collinearity VIF test using the WarpPLS. Average block VIF was 3.56 and average full collinearity VIF 4.12, revealing no multicollinearity (Kock & Lynn, 2012).

5. Results

5.1. Findings

Table 1 reports the means, standard deviations, and zero-order Pearson correlations for all variables. Table 2 reports results for competitive propensity. We did not propose whether TMT MED has a positive or negative effect on competitive propensity as both relationships can be argued. Models 2 and 6 of Table 2 suggest that TMT MED is in fact negatively related to competitive propensity ($\beta = -0.17$, $p = 0.04$; $\beta = -0.15$, $p = 0.08$).

H1 proposes that organizational slack negatively moderates the relationship between TMT MED and competitive propensity. TMT MED does indeed show a negative and statistically significant interaction with organizational slack, as shown in Model 3 ($\beta = -0.23$, $p = 0.01$) and Model 7 ($\beta = -0.23$, $p = 0.01$) of Table 2. The interaction plot in Fig. 2 shows that TMT MED is negatively related to competitive propensity when organizational slack is high (+1 standard deviation), but the effect is reversed and becomes positive when slack is low (−1 standard deviation).[4] Thus, H1 is supported.

H2 proposes that strategic investment positively moderates the relationship between TMT MED and competitive propensity. Such diversity does indeed have a positive and significant interaction with strategic investment, as shown in Model 4 ($\beta = 0.19$, $p = 0.03$) and Model 8 ($\beta = 0.20$, $p = 0.02$) of Table 2. The interaction plot in Fig. 3 illustrates that the negative impact of TMT MED on competitive propensity is mitigated when strategic investment is higher versus lower. Thus, H2 is supported.

H3 proposes that competitive propensity has an inverted-U-shaped effect on firm performance. In predicting ROA, the linear coefficient for competitive propensity of Model 3, Table 3, shows a positive significant relationship ($\beta = 0.36$, $p = 0.04$), whereas its squared term shows a negative significant relationship ($\beta = -0.32$, $p = 0.05$). Similarly, in predicting NPM, the linear coefficient for competitive propensity shows a significantly positive relationship ($\beta = 0.54$, $p = 0.05$), whereas the squared term shows a negative but marginally significant relationship ($\beta = -0.46$, $p = 0.08$), as shown in Model 6. Fig. 4 shows that increasing levels of competitive propensity are associated with increases in ROA, up to a certain level of competitive propensity, after which further increases in propensity are associated with decreases in

[3] While studies have measured a broad concept of cognitive diversity, some scholars have begun to question the broad measure and called for a more focused and precise operationalization of measurement in strategic management (e.g., Miller et al., 2022; Samba et al., 2018; Shin et al., 2012). Specifically, the conceptualization and measurement of cognitive diversity should be relevant to the outcome variables. Our inclusion of items related to firm strategies and goals and the adoption of the term "mean-end diversity" enables us to explore the more nuanced impact of cognitive diversity on competitive behavior.

[4] Figs. 2, 3 and 4 present the results by including ROA (t-1) as the control for past performance. The results are consistent if we replace ROA (t-1) with NPM (t-1) as the control variable for past performance.

Table 1
Means, standard deviations, and correlations[a].

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 Firm age[b]	4.23	0.37																			
2 Firm size[b]	6.04	1.50	−0.19*																		
3 Previous return on assets	4.63	12.94	−0.09	0.34**																	
4 Previous net profit margin	3.89	10.38	0.00	0.23*	0.96**																
5 TMT size	11.77	6.45	−0.41**	0.33**	0.14	0.10															
6 TMT age diversity	0.11	0.08	0.01	0.08	−0.04	0.03	−0.06														
7 TMT tenure diversity	0.42	0.32	0.01	−0.02	−0.02	−0.03	0.05	0.34**													
8 TMT educational diversity	0.38	0.20	−0.16	−0.17*	−0.10	−0.12	0.18*	−0.04	−0.01												
9 TMT functional diversity	0.41	0.14	−0.17	−0.02	0.08	0.01	0.08	0.13	0.09	0.12											
10 High-tech manufacturing	0.40	0.49	0.27**	−0.11	−0.28**	−0.21*	−0.34**	−0.10	−0.10	−0.17	−0.14										
11 Medium-high-tech manufacturing	0.17	0.38	−0.05	0.01	0.09	−0.01	0.11	0.17*	−0.02	0.11	−0.03	−0.37**									
12 Medium-low-tech manufacturing	0.15	0.36	−0.01	0.02	0.05	0.06	−0.01	0.09	0.01	0.01	0.13	−0.34**	−0.19*								
13 Low-tech manufacturing	0.10	0.31	−0.27**	0.05	0.11	0.07	0.17	−0.11	0.17*	0.09	0.11	−0.28**	−0.15	−0.14							
14 Service industry	0.18	0.38	−0.07	0.06	0.14	0.14	0.20*	−0.04	0.00	0.03	0.00	−0.38**	−0.21*	−0.19*	−0.16						
15 TMT means-ends diversity	2.61	0.73	0.01	−0.05	−0.07	−0.04	0.00	0.10	0.07	0.04	−0.11	0.13	0.08	−0.12	−0.04	−0.10					
16 Competitive propensity	5.79	15.83	−0.10	0.40**	0.11	0.04	0.12	0.10	−0.05	−0.04	0.06	−0.01	−0.08	−0.11	0.04	0.17	−0.18*				
17 Organizational slack	0.42	0.22	−0.32**	0.54**	0.11	−0.05	0.38**	0.11	0.09	0.01	0.00	−0.26**	0.05	−0.01	0.07	0.24**	0.00	0.31**			
18 Strategic investment	4.99	0.95	0.05	0.03	0.06	0.13	0.02	−0.08	−0.08	−0.05	−0.01	0.10	0.05	0.06	−0.13	−0.14	−0.11	−0.03	−0.10		
19 Return on assets	1.80	10.44	−0.19*	0.30**	0.74**	0.70**	0.15	−0.08	−0.06	0.01	0.12	−0.36**	0.10	0.17*	0.13	0.09	−0.08	0.11	0.07	0.06	
20 Net profit margin	4.42	13.25	−0.18*	0.16	0.36**	0.36**	0.14	−0.01	−0.01	0.00	−0.03	−0.16	−0.04	0.04	0.02	0.19*	−0.09	0.12	0.03	0.05	0.49**

[a] $N = 135$, except for net profit margin and net profit margin (t-1), in which $N = 127$. *$p < 0.05$, **$p < 0.01$.
[b] Logarithm.

ROA. The data presents a similar curve for NPM. Thus, H3 is largely supported.

5.2. *Post hoc analyses*

We conducted several additional analyses to gain further insights and check the robustness of our findings across model specifications.[5]

5.2.1. *Mediating effects*

First, we intentionally disregarded consideration of performance within the primary model, but an engaging proposition concerns the indirect effect of TMT MED on firm performance via competitive propensity. By showing the strategic process by which TMT MED influences firm performance, we clarify the distant financial consequences of such TMT heterogeneity (Hambrick, 2007; Miller et al., 2022), and the promise of competitive dynamics in bridging micro- and macro- perspectives (Chen & Miller, 2015). As the effect of competitive propensity on firm performance is nonlinear (H3), we employed Hayes and Preacher (2010) SPSS macro “MEDCURVE” to explore the nonlinear mediation. The method assesses an indirect effect, quantifying the impact of TMT MED on performance via competitive propensity at low (−1 standard deviation), moderate (mean), and high (+1 standard deviation) levels. Results based on 10,000 bootstrap samples revealed a significant indirect effect at the left extreme (−1 standard deviation) (for ROA: $\theta = -0.76$, 95 % CI [−2.20, −0.14]; for NPM: $\theta = -1.28$, 95 % CI [−4.78, −0.19]). Likewise, a significant indirect effect was observed at the right extreme (+1 standard deviation) (for ROA: $\theta = -0.83$, 95 % CI [−2.71, −0.15]; for NPM: $\theta = -1.40$, 95 % CI [−5.73, −0.18]).

These findings indicate that as TMT MED increases, performance falls with changes in competitive propensity. The curvilinear mediation effect of propensity was represented by parameter θ. Since θ varied linearly with competitive propensity, its difference for high and low values of propensity reflected the curvilinear mediation effect size (Hayes & Preacher, 2010). In our case, the difference for high and low values of propensity was −0.07 for ROA and − 0.12 for NPM, illustrating that competitive propensity links TMT MED to firm performance via a curvilinear path.

5.2.2. *Robustness of top team composition*

Although we averaged 2.71 respondents per firm, aligning with previous TMT research (e.g., Chen et al., 2010), we conducted a supplementary analysis on a subset of 77 firms, each with a minimum of three responses. The results remained consistent with those for the full sample, showing that TMT MED is negatively related to competitive propensity ($\beta = -0.35, p = 0.02$). That negative effect is exacerbated by organizational slack ($\beta = -0.07, p = 0.05$), and mitigated by a high level of strategic investment ($\beta = 0.26$, $p = 0.02$).

5.2.3. *MED versus demographic diversity*

We tested whether TMT demographic heterogeneity could be a proxy for TMT MED. Results show that demographic heterogeneity in age ($\beta = 0.09$, $p = 0.37$), tenure ($\beta = 0.05$, $p = 0.57$), function ($\beta = -0.20$, $p = 0.20$), and education ($\beta = 0.06, p = 0.46$) was not significantly related to TMT MED. TMT demographic heterogeneity also was not related to competitive propensity (See model 1 in Table 2).

5.2.4. *Endogeneity*

Although we used time lags and multiple data sources to mitigate concerns of reverse causality, to further address potential endogeneity in TMT MED, we adopted an instrumental variable two-stage least squares (IV-2SLS) procedure (Bascle, 2008; Semadeni et al., 2014). We adopted

[5] To save space, unless explicitly stated otherwise, all post-doc analyses involving control for past performance used ROA (t-1). The results remain consistent by replacing it with NPM (t-1).

Table 2
Regression results of TMT means-ends diversity on competitive propensity[a].

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Firm age[b]	0.01 (0.95)	0.00 (0.98)	0.01 (0.94)	0.01 (0.90)	0.01 (0.94)	0.00 (0.96)	0.01 (0.92)	0.01 (0.90)
Firm size[b]	0.35 (0.00)	0.34 (0.00)	0.32 (0.00)	0.35 (0.00)	0.36 (0.00)	0.34 (0.00)	0.33 (0.00)	0.35 (0.00)
Return on assets (t-1)	−0.01 (0.93)	−0.01 (0.93)	−0.04 (0.68)	0.01 (0.95)				
Net profit margin (t-1)					−0.04 (0.70)	−0.03 (0.76)	−0.06 (0.51)	0.01 (0.92)
TMT size	−0.05 (0.61)	−0.04 (0.70)	−0.02 (0.82)	−0.04 (0.67)	−0.05 (0.62)	−0.04 (0.71)	−0.02 (0.81)	−0.04 (0.65)
TMT age diversity	0.11 (0.23)	0.13 (0.17)	0.14 (0.11)	0.13 (0.14)	0.12 (0.19)	0.13 (0.16)	0.15 (0.10)	0.14 (0.16)
TMT tenure diversity	−0.10 (0.28)	−0.09 (0.32)	−0.12 (0.18)	−0.11 (0.21)	−0.09 (0.35)	−0.08 (0.36)	−0.11 (0.21)	−0.11 (0.23)
TMT educational diversity	0.04 (0.68)	0.04 (0.62)	0.06 (0.47)	0.05 (0.54)	0.05 (0.61)	0.05 (0.60)	0.07 (0.45)	0.05 (0.54)
TMT functional diversity	0.08 (0.35)	0.06 (0.47)	0.04 (0.64)	0.05 (0.56)	0.10 (0.24)	0.08 (0.35)	0.07 (0.43)	0.08 (0.36)
High-tech manufacturing	−0.02 (0.92)	0.02 (0.90)	−0.02 (0.88)	0.01 (0.92)	−0.02 (0.90)	0.01 (0.95)	−0.03 (0.82)	0.01(0.94)
Medium-high-tech manufacturing	−0.13 (0.31)	−0.11 (0.39)	−0.15 (0.23)	−0.14 (0.27)	−0.13 (0.34)	−0.11 (0.41)	−0.15 (0.24)	−0.13 (0.31)
Medium-low-tech manufacturing	−0.15 (0.22)	−0.15 (0.21)	−0.18 (0.13)	−0.15 (0.20)	−0.15 (0.24)	−0.15 (0.23)	−0.18 (0.14)	−0.15 (0.23)
Service industry	0.07 (0.61)	0.06 (0.64)	0.03 (0.83)	0.05 (0.66)	0.07 (0.60)	0.06 (0.64)	0.03 (0.82)	0.05 (0.67)
Organizational slack	0.13 (0.23)	0.14 (0.20)	0.11 (0.29)	0.14 (0.17)	0.14 (0.20)	0.14 (0.17)	0.12 (0.27)	0.16 (0.212)
Strategic investment	−0.00 (0.98)	−0.02 (0.77)	−0.05 (0.58)	−0.03 (0.68)	−0.02 (0.82)	−0.04 (0.65)	−0.06 (0.49)	−0.06 (0.50)
TMT means-ends diversity		−0.17 (0.04)	−0.22 (0.01)	−0.22 (0.01)		−0.15 (0.08)	−0.19 (0.02)	−0.20 (0.02)
TMT means-ends diversity × Organizational slack			−0.23 (0.01)				−0.23 (0.01)	
TMT means-ends diversity × Strategic investment				0.19 (0.03)				0.20 (0.02)
N	135	135	135	135	127	127	127	127
R^2	0.23	0.26	0.30	0.29	0.25	0.27	0.31	0.30
R^2 change		0.03	0.04	0.03		0.02	0.05	0.03

[a] Standardized regression coefficients are shown, *P*-values in parentheses.
[b] Logarithm.

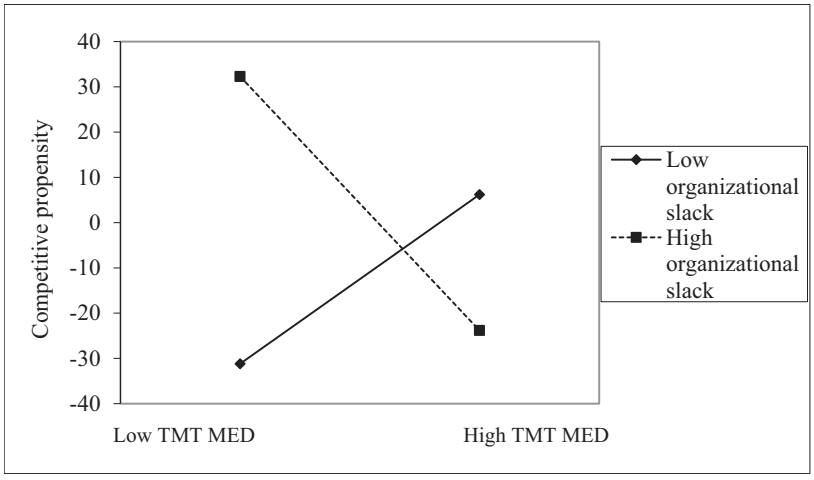

Fig. 2. Interaction of TMT MED with organizational slack in the prediction of competitive propensity.

two instruments: firm ownership (coded as 1 for joint venture, and 0 for non-joint venture) and CEO duality (coded as 1 for yes, and 0 for no). Joint venture companies are more apt to have TMTs incorporating different cultures, thereby influencing MED (Nielsen & Nielsen, 2013). Moreover, a CEO who also serves as board chair has more power to influence the makeup or the functioning of the top team (Finkelstein et al., 2009). Such power concentration can limit the diversity of viewpoints on the team (Krause et al., 2014). These instruments, firm ownership ($p = 0.52$) and CEO duality ($p = 0.26$), were chosen to be exogenous to competitive propensity (Semadeni et al., 2014).

Our tests for weak instruments, overidentifying restrictions, and Hausman specifications validated a strong instrumental variable model. The initial regression yielded a Cragg-Donald *F*-statistic of 11.52 ($p = 0.00$), surpassing the threshold of 10 and indicating robust instrument strength (Wooldridge, 2016). The overidentifying restriction test, *J*-statistic of 0.18 ($p = 0.67$), did not reject the null hypothesis that all instruments are exogenous, affirming the validity of multiple instruments (Bascle, 2008). Hausman's test on all instruments confirmed efficient ordinary least squares with zero residual, and differences in regression coefficients from the IV-2SLS were not significant ($F = 2.36$, $p = 0.18$) (Wooldridge, 2016).

We then used the *xtivreg2* command in Stata, assessing the exogeneity of TMT MED. Our two instruments were used as predictors in the first-stage analysis to estimate diversity. Results showed significant

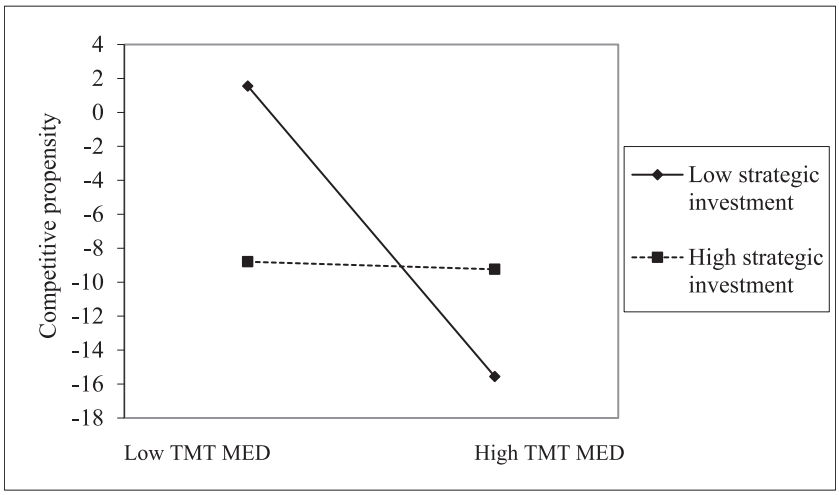

Fig. 3. Interaction of TMT MED with strategic investment in the prediction of competitive propensity.

Table 3
Regression Results of Competitive Propensity on Firm Performance[a].

	Return on Assets			Net Profit Margin		
Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Firm age[b]	−0.11 (0.11)	−0.11 (0.11)	−0.10 (0.11)	−0.19 (0.05)	−0.19 (0.05)	−0.19 (0.06)
Firm size[b]	0.13 (0.10)	0.11 (0.17)	0.07 (0.42)	0.10 (0.36)	0.07 (0.54)	0.01 (0.91)
Return on assets (t-1)	0.68 (0.00)	0.68 (0.00)	0.69 (0.00)			
Net profit margin (t-1)				0.30 (0.00)	0.31 (0.00)	0.32 (0.00)
TMT size	−0.04 (0.56)	−0.04 (0.58)	−0.07 (0.39)	0.01 (0.89)	0.02 (0.87)	−0.02 (0.83)
TMT age diversity	−0.07 (0.29)	−0.08 (0.25)	−0.08 (0.21)	−0.02 (0.86)	−0.03 (0.77)	−0.04 (0.66)
TMT tenure diversity	−0.02 (0.72)	−0.02 (0.78)	−0.02 (0.78)	0.03 (0.72)	0.04 (0.67)	0.04 (0.67)
TMT educational diversity	0.06 (0.32)	0.06 (0.34)	0.08 (0.20)	0.04 (0.70)	0.03 (0.74)	0.06 (0.54)
TMT functional diversity	0.03 (0.62)	0.03 (0.65)	0.02 (0.73)	−0.08 (0.37)	−0.09 (0.33)	−0.10 (0.28)
High-tech manufacturing	−0.15 (0.18)	−0.15 (0.18)	−0.13 (0.25)	0.04 (0.81)	0.04 (0.81)	0.07 (0.68)
Medium-high-tech manufacturing	0.01 (0.6)	0.01 (0.92)	0.04 (0.68)	0.03 (0.84)	0.04 (0.79)	0.08 (0.58)
Medium-low-tech manufacturing	0.06 (0.50)	0.07 (0.45)	0.10 (0.26)	0.08 (0.54)	0.09 (0.48)	0.14 (0.29)
Service industry	−0.02 (0.81)	−0.02 (0.78)	−0.00 (0.96)	0.18 (0.17)	0.18 (0.18)	0.21 (0.12)
Organizational slack	−0.12 (0.13)	−0.12 (0.11)	−0.11(0.13)	−0.10 (0.37)	−0.11 (0.32)	−0.10 (0.34)
Strategic investment	0.02 (0.68)	0.03 (0.67)	0.01 (0.94)	0.02 (0.85)	0.02 (0.82)	−0.01 (0.94)
TMT means-ends diversity	0.03 (0.64)	0.04 (0.55)	0.05 (0.45)	−0.06 (0.50)	−0.05 (0.60)	−0.04 (0.68)
Competitive propensity		0.05 (0.45)	0.36 (0.04)		0.09 (0.38)	0.54 (0.05)
Competitive propensity squared			−0.32 (0.05)			−0.46 (0.08)
N	135	135	135	127	127	127
R^2	0.79	0.79	0.81	0.44	0.45	0.48
R^2 change		0.0	0.02		0.01	0.03

[a] Standardized regression coefficients are shown, *P*-values in parentheses.
[b] Logarithm.

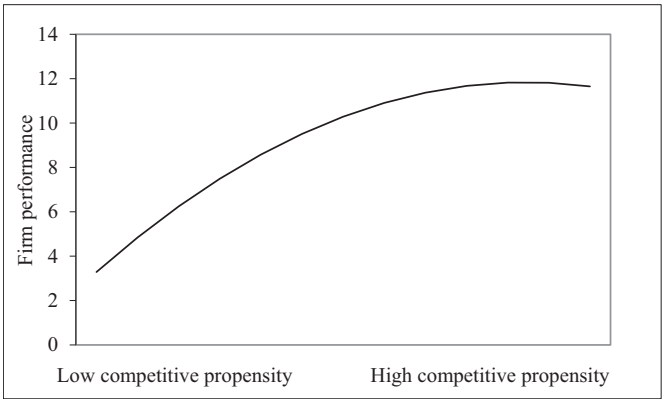

Fig. 4. Inverted-U-shaped relationship between competitive propensity and firm performance.

associations of diversity with firm ownership ($\beta = 0.22$, $p = 0.01$) and CEO duality ($\beta = 0.19$, $p = 0.02$), fulfilling the condition of instrument relevance (Bascle, 2008). The residual from the first-stage analysis was then employed as an endogenous variable proxy in the second-stage equation. The analysis did not reject the null hypothesis. Thus, the observed effect of TMT MED on competitive propensity was not attributable to endogeneity (Semadeni et al., 2014; Wooldridge, 2016).

6. Discussion

6.1. Contributions

Some research on TMT diversity suggests that it facilitates broader information collection and processing and thus enhances performance. We found, however, that it reduces competitive propensity, which in turn demonstrates an inverted-U-shaped relationship with performance, such that too weak and too much a propensity for strategic action erodes performance.

Our research makes several contributions. First, building on TMT

diversity and competitive dynamics perspectives, we develop and test a model that proposes that TMT MED affects *actual* strategic behavior in the form of competitive propensity, which in turn shapes performance. Linking TMT MED to competitive behavior informs competitive dynamics research (Chen, 1996; Ferrier, 2001), which largely has neglected the role of the TMT and its underlying beliefs and preferences (Chen et al., 2010; Menon, 2018). It refines our understanding of how competitive action is shaped by disparities in TMT members' goals and preferred means of achieving them (Chen & Miller, 2015). Whereas prior studies in competitive dynamics view resource and market factors as principal drivers of rivalry (e.g., Chen, 1996; Sirmon & Hitt, 2009), we demonstrate TMT MED to be influential in competitive behavior. Our findings also modify prior arguments on the impact of TMT diversity (Miller et al., 2022), contrasting with studies arguing that a heterogeneous TMT benefits competitiveness (Ferrier & Lyon, 2004; Hambrick et al., 1996). Although TMT MED may well generate more competitive options, appraisal and selection among these options can be hindered by disparities in member views in interpretation and priorities among team members. Counterproductive bargaining also may prevail among decision makers due to conflicting goals and preferences.

We also contribute to the research on competitive dynamics and TMT MED by investigating the moderating effects of two countervailing resource influences: fungible resources in the form of organizational slack, and non-fungible resources in the form of strategic investment. Whereas competitive dynamics scholars have argued for a positive effect of slack on both strategic decisions and performance (Carnes et al., 2019), we proposed a counterargument that firms may not benefit from high levels of slack (cf. Cyert & March, 1963;Miller et al., 2022; Samba et al., 2018). Slack can constrain competitive initiative such that TMTs whose firms enjoy high levels of slack are less pressured to reconcile their divergent beliefs on prospective initiatives. Whereas most studies have focused on the direct and positive impact of slack, we propose its indirect and negative effects as a fruitful avenue for future research. Strategic resource orchestration in the form of strategic investment also can influence the relationship between TMT MED and competitive propensity – but in an opposite direction to slack. It mitigates the negative impact of divergent team member beliefs on competitive actions, shedding light on the importance of strategic investment in aligning top team goals and approaches for taking competitive action. In summary, contrasting types of resources can either facilitate or delay competitive action. Considering these opposing effects not only addresses the ambiguities on the relationship between TMT diversity and strategic decisions but reveals the nuanced context of resources in conditioning the effect of MED (Miller et al., 2022; Samba et al., 2018).

In addition, we contribute to the research on TMT strategic decisions. Answering calls from Hambrick (2007) and Bromiley and Rau (2016) to go beyond upper echelon demographic factors, we incorporate MED in TMTs to explain strategic behavior. Complementing Nadkarni and Barr (2008) and Miller et al. (1998), we demonstrate how TMT MED influences strategic decisions and firm performance. This is important as our supplementary results indicate a lack of association between TMT MED and TMT heterogeneity in age, tenure, function and education, suggesting that diversity in executive beliefs and preferences is not a product of demographic characteristics (Miller et al., 2022; Wei & Wu, 2013). Instead, it must be considered independently in predicting strategic behavior. These insights, together with our direct assessment of TMT MED, advance upper echelon predictions of why and how TMT characteristics influence strategic outcomes (Bromiley & Rau, 2016; Chen et al., 2021).

6.2. Limitations and future research directions

Certainly, our study has limitations. First, although we did poll multiple top team members in each firm, we did not sit in on their decision making and did not study the fine-grained interpersonal relations and interactions that influenced their competitive decisions (Samba et al., 2018). Thus, our findings are inferential. Second, our analysis is cross-sectional, not longitudinal. Third, we used subjective perceptions of disagreement rather than objective measures, and focused on disagreement concerning means and ends (Miller et al., 1998) rather than other aspects of cognitive diversity. Finally, our findings may be specific to public Taiwanese enterprises. In short, generality has yet to be established.

These limitations suggest avenues for future research. Subsequent studies could extend our work by measuring cognitive diversity more broadly and going into greater detail in assessing the subjective and objective cognitive differences among TMT members. For example, organizational neuroscience research has proposed the use of technologies such as electroencephalogram to collect neurological proxies of a working team's shared cognitions (e.g., Wang et al., 2021). It would also be useful to conduct multiple surveys over time in a more fine-grained longitudinal analysis. That might reveal how TMT MED evolves and affects team functioning and interpersonal relations and strategic behavior. For example, does it affect interpersonal relations, or cause team conflict or turnover? Do very low or high levels of diversity moderate over time? When does diversity lead to better versus worse strategic decisions? It may be beneficial too to explore additional moderator variables; for instance, at the team level, exploring behavioral integration as it affects diversity. What is the impact of CEO characteristics on the repercussions of team diversity? An authoritative CEO can facilitate consensus within a team (Chen et al., 2021; Krause et al., 2014), while an indecisive one may become overwhelmed and add to the problem.

CRediT authorship contribution statement

Wei Yang: Writing – original draft, review & editing Conceptualization. **Sicheng Luo**: Writing – original draft, review & editing, Conceptualization, Methodology, Formal analysis, Project administration. **Danny Miller**: Writing – review & editing, Conceptualization. **Hao-Chieh Lin**: Investigation, Funding acquisition, Data curation.

Declaration of competing interest

The Authors declare that there is no conflict of interest.

This work was supported by the Researcher Support Scheme of the University of Glasgow.

Acknowledgements

We thank our colleagues, Tianxu Chen, Walter Ferrier, Gerry McNamara, Dimitry Sharapov, and Tieying Yu, for their constructive comments on early versions of this paper. All errors remain our responsibility.

Appendix A. Selected review of team diversity research in management

Research	Key concept	Definition of key concept	Main arguments and findings	Measurement of key concept
Cronin and Weingart (2007)	Representational gap	Differences between team members' problem definitions	Representational gaps make it more difficult for team members to integrate one another's information and increase the likelihood of conflict.	N.A.
Dooley and Fryxell (1999)	Dissent in strategic decision-making teams	Divergence in the opinions of team members concerning the implications of facts and information or the proper course of action	Perceptions of loyalty within teams strengthen the relationship between dissent and decision quality. Perceptions of within-team competence strengthen the relationship between dissent and decision commitment. The impact of dissent on performance may be contingent on loyalty and competence of the team.	(1) To what extent did team members openly express a difference of opinion? (2) To what extent did team members voice dissent while making this decision?
Iaquinto and Fredrickson (1997)	TMT agreement during decision process	TMT agreement refers to the level of consensus or shared understanding among the TMT members regarding the strategic decision-making process	A high level of TMT agreement can positively impact organizational performance, as it allows the team to focus on the substance of critical decisions without getting bogged down in debates about the decision-making process itself.	(1) Participants were first asked to read a decision scenario that describes a significant issue facing a firm in their industry. They then responded to a series of questions designed to describe how their firm would address the scenario. (2) A questionnaire included 43 questions intended to measure the comprehensiveness of the strategic decision-making process.
Kilduff et al. (2000)	Cognitive diversity in TMT	Variability concerning relatively unobservable attributes such as attitudes, values, and beliefs	Results showed that members of high-performing teams tended to preserve multiple interpretations early in the team's life cycle, but that they moved towards greater clarity near the end of the life cycle. These high-performing teams, therefore, exhibited both early interpretative ambiguity and late heedful interrelating. Cognitive diversity in teams affected and was affected by changes in firm performance. There was no evidence of any effect of demographic diversity on measures of cognitive diversity.	(1) Perception of role specialization. (2) Distribution of power. (3) Agreement about the causes of performance. (4) Perception of team decision making. (5) Individual's agreement with team decision making. (6) Were there some obvious ways in which the organization could be run more effectively?
Miller et al. (1998)	Cognitive diversity of executives	Differences in beliefs and preferences held by upper-echelon executives within a firm. More specifically, cognitive diversity refers to variation in beliefs concerning cause-effect relationships and variation in preferences concerning various goals for the organization.	Executives' cognitive diversity inhibits comprehensiveness of strategic decision-making and inhibits extensiveness of strategic planning. Cognitive diversity indirectly and negatively affects performance.	How strongly do members of the top management agree or disagree with each other about … (1) the best way to maximize the firm's long term profitability? (2) what the firm's goal priorities should be? (3) the best way to ensure the firm's long-run survival? (4) which organizational objectives should be considered most important?
Olson et al. (2007)	Cognitive diversity. Task conflict in the TMT	Cognitive diversity is defined as differences of beliefs concerning cause-effect relationships relating to various goals of organization (cf. Miller et al., 1998.) Task conflict arises from judgmental differences about the task at hand.	Cognitive diversity has a strong positive relationship with task conflict and competence-based trust strengthens this relationship. Task conflict mediates the effects of cognitive diversity on decision outcomes (e.g., decision quality).	Cognitive diversity is measured using the four items adopted from Miller et al. (1998). Distinguished belief diversity and preference diversity. Task conflict is measured with three items adapted from Jehn (1994).
Simsek et al. (2005)	Goal preference diversity	Goal preference diversity (cf. Miller et al., 1998) concerns the TMT's general level of diversity with respect to preferred goals for its firm.	CEO-, team-, and firm-level determinants shape behavioral integration. In particular, team diversity in terms of goal preferences and education were negatively associated with behavioral integration, which has a positive association with firm performance.	To what extent had your TMT members generally differed over the past two years in the areas of: (1) risk taking; (2) firm expansion; (3) the importance of change; (4) goals in general.
Van der Vegt and Janssen (2003)	Cognitive diversity	Team members' differences with regard to such aspects as task-related knowledge, skills, and abilities, as well as values, beliefs, and attitudes	Perceived task interdependence is positively related to innovative behavior when the group's cognitive diversity is high and when group members perceive a high level of goal interdependence.	To what extent the members of the work group differed (1) in their way of thinking; (2) in their knowledge and skills; (3) in how they viewed the world; (4) in their beliefs about what is right and wrong.
Wei and Wu (2013)	Cognitive diversity in TMT	Unlike demographic differences, cognitive diversity is more deep level diversity in aspects such as beliefs and perspectives which are less visible but often more task related.	Team interdependence and team cohesion moderate in the linkage between TMT cognitive diversity and elaboration of task-related information. TMT's elaboration of task-related information mediates the interactive effects of TMT cognitive diversity and team interdependence on firm performance as well as the interactive effects of TMT cognitive diversity and team cohesion on firm performance.	Adopted from Van der Vegt and Janssen (2003). To what extent the firm's top managers differed in: (1) their way of thinking; (2) their knowledge and skills; (3) how they viewed the world; (4) their beliefs about what is right and wrong.

Appendix B. Items in scales

Variables and items		SFL[c]	AVE[c]	CR[c]
TMT means-ends diversity[a,b]			0.80	0.94
How strongly do TMT members agree or disagree with each other about				
1.	The best way to maximize the firm's profitability?	0.85		
2.	What the firm's goal priorities should be?	0.88		
3.	The best way to ensure the firm's long-run survival?	0.91		
4.	The best way to formulate and implement competitive strategies?	0.93		
Strategic investment			0.73	0.91
Compared with the direct rivals,				
1.	Our firm invests more in R&D.	0.84		
2.	Our firm invests more in human capital (e.g., sales training).	0.88		
3.	Our firm invests more in internal management systems (e.g., knowledge management, quality management).	0.90		
4.	Our firm invests more in operations process improvement.	0.84		

[a] All means-ends diversity items were reverse coded.
[b] Item 2 is related to preference diversity; items 1, 3 and 4 are related to cause-effect diversity.
[c] SFL = Standardized factor loadings, AVE = Average variance extracted, CR = Composite reliability.

Data availability

Data will be made available on request.

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