Strategic Management Journal
Strat. Mgmt. J., **31**: 1410–1430 (2010)
Published online EarlyView in Wiley Online Library (wileyonlinelibrary.com) DOI: 10.1002/smj.891
Received 14 November 2008; *Final revision received 5 July 2010*

NAVIGATING IN A HYPERCOMPETITIVE ENVIRONMENT: THE ROLES OF ACTION AGGRESSIVENESS AND TMT INTEGRATION

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Recognizing that both the hypercompetition and competitive dynamics research streams rely on Austrian economics and its idea of temporary advantage as an intellectual cornerstone, the present study merges these related, but thus far, disparate perspectives. It develops hypotheses that relate the intensity of the hypercompetitive environment and a firm's TMT dynamics to its action aggressiveness, or the volume and speed with which a firm engages its rivals. Using a survey-based sample of 104 Taiwanese firms, this study's findings show that the hypercompetitive environment and TMT sociobehavioral integration have direct and interacting effects on firms' action aggressiveness. Moreover, action aggressiveness is an important mediator between TMT integration and firm performance, particularly under hypercompetitive conditions. As such, the study contributes to our understanding of temporary advantage by revealing TMT integration and action aggressiveness as two essential organizational mechanisms for navigating in the hypercompetitive context. Finally, reflective of temporary advantage as a defining feature of hypercompetition, our findings show that performance variation is greater within this context. The article contributes to hypercompetition and competitive dynamics research by providing an integrated perspective of competitive behavior within the broad context of hypercompetitive environment, TMT dynamics, and firm performance.

INTRODUCTION

A common sentiment among strategic management scholars and practicing managers is that competition is becoming increasingly intense and dynamic, making it difficult for firms to sustain advantages. Among scholars, Bettis and Hitt (1995) highlighted the increasing pace of technological change and strategic discontinuities. Others have drawn attention to the Red Queen effect or the idea that a competitive success spurs rivals to respond with their own innovative actions to enhance performance (Barnett and Hansen, 1996; Derfus *et al.*, 2008). As a result, firms engage in an escalating series of competitive actions simply to maintain pace with opponents, which

Keywords: temporary advantage; hypercompetition; competitive dynamics; top management teams
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leads to an environment of great competitive intensity.

Hypercompetition and competitive dynamics constitute two primary perspectives for understanding how the dynamism and competitive intensity of a business environment lead to temporary advantage. Identified as an 'environment in which advantages are rapidly created and destroyed' (D'Aveni, 1994: 2), hypercompetition is 'characterized by intense and rapid competitive moves, in which competitors must move quickly to build advantages and erode the advantage of their rivals' (1994: 217–218). A number of scholars have conducted studies to show the prevalence of hypercompetition, however, most have occurred at an aggregated level and emphasized environmental context (Thomas, 1996; McNamara, Vaaler, and Devers, 2003; Wiggins and Ruefli, 2005). In contrast, relatively little empirical work has been conducted at the firm level, examining how a firm might decide, act, and prosper in a hypercompetitive environment.

To enhance our understanding of hypercompetition, particularly at the individual firm level, we turn to competitive dynamics research, which focuses on the exchange of moves among rivals (Smith, Ferrier, and Ndofor, 2001). This line of work has shown the significance of action and response attributes, such as volume (Ferrier, Smith, and Grimm, 1999) and speed (Yu and Cannella, 2007), but has paid relatively little attention to the environmental context in which these attributes emerge (with noted exceptions such as Ferrier (2001) and Derfus *et al*. (2008). To control for the impact of environment, competitive dynamics research has tended to conduct single-industry studies and has typically sampled from a limited set of industries in the U.S., such as airlines (Chen and MacMillan, 1992) and software (Young, Smith, and Grimm, 1996). As a result of the lack of environmental considerations, the generalizability of research findings has been constrained. While important work has begun to take into account specific elements of the environment, including industry concentration and growth (Derfus *et al*., 2008), research has yet to investigate systematically broad environmental conditions—such as volatility or hypercompetition—and its influence on firm-level competitive behavior.

While the study of hypercompetition and competitive dynamics has progressed along independent lines, both share Austrian economics as a common intellectual cornerstone. Austrian economics is a market logic that emphasizes entrepreneurial discovery and temporary advantage rather than equilibrium and positioning in stable markets (Jacobson, 1992). Opportunities are emergent and fleeting and are discovered through managers' active innovations and competitive initiatives (Kirzner, 1997). Premised on disequilibrium, the Austrian school views firm advantage as transient, with a limited temporal window for exploitation (Roberts and Eisenhardt, 2003). Finally, the decision process by which management undertakes continuous engagement and experimentation in the market is a central but underdeveloped element of the Austrian school.

Recognizing the common intellectual root of the Austrian school, the study draws on hypercompetition and competitive dynamics research to examine the impact of a hypercompetitive environment on firm-level competitive behavior and performance. A hypercompetitive environment is characterized by a high degree of uncertainty and volatility derived from the task environment in which a firm competes (Dess and Beard, 1984). In this environment, temporary advantage is the norm and prolific competitive activity is likely to be rewarded. Following Hambrick, Cho, and Chen (1996), we consider a firm's top management team (TMT) to be a critical antecedent of a firm's competitive behavior. To study TMT, we focus on sociobehavioral integration, or the degree to which TMT members work together as a team (Smith *et al*., 1994; Simsek *et al*., 2005). Finally, to study competitive behavior, we focus on action aggressiveness, or the extent to which a firm is likely to engage with its rivals and act swiftly in its engagement. Our research addresses the two related questions of (1) how the hypercompetitiveness of the environment and TMT sociobehavioral integration affect a firm's action aggressiveness; and (2) what role the intensity of a hypercompetitive environment plays in linking TMT integration, action aggressiveness, temporary advantage, and firm performance.

These issues are explored within a sample of 104 Taiwanese firms. With some important exceptions (see Yu and Cannella, 2007), the majority of hypercompetition and competitive dynamic studies

DOI: 10.1002/smj

have been conducted within the U.S. marketplace. There is a need to expand the research across different cultural and economic contexts. Taiwan, which has been recognized as an extremely competitive and dynamic environment, seems to be ideal for such an expansion. Its information technology sector was recently ranked the second most competitive in the world (Economist Intelligence Unit, 2008), and the World Economic Forum has consistently ranked Taiwan as one of the top 15 economies in its global competitiveness survey.

The article contributes to both hypercompetition and competitive dynamics research by providing an integrated perspective of competitive behavior within the broad context of hypercompetitive environment, TMT dynamics, and firm performance. Our research also contributes to TMT research by revealing the pivotal role that executive leadership plays in hypercompetition and interfirm rivalry. As such, the study brings people and leadership back into the center of strategy research without disregarding competition (Montgomery, 2008).

THEORETICAL BACKGROUND

Figure 1 presents our research model, highlighting the pivotal roles that action aggressiveness and TMT dynamics play in navigating within a hypercompetitive environment where temporary advantage and performance volatility are the norm. Action aggressiveness and TMT integration are deemed key attributes enabling firms to maneuver in a hypercompetitive environment to create temporary advantage. Figure 1 also outlines the hypotheses developed in detail in the next section.

Action aggressiveness and TMT dynamics

One important premise of competitive dynamics is that competitive advantage is time dependent and ephemeral, and any advantage gained by a firm through its actions will be negated sooner or later by competitors' responses. Thus, early competitive dynamics research devoted its attention to the prediction of competitive response (Chen and MacMillan, 1992; Chen and Miller, 1994). Speedy and/or aggressive competitive behavior is a salient feature of many industries characterized by temporary advantage (Thomas and D'Aveni, 2009). In our study, we consider action aggressiveness and TMT sociobehavioral integration to be organizational responses to the phenomenon of temporary advantage. To deal with the competitive reality that only temporary advantages matter, firms need to be aggressive by taking a large number of actions with great speed (MacMillan, 1989). Equally important, to support this high level of activity in the marketplace, firms need effective and efficient internal structures. The top management team, we believe, is the linchpin that coordinates and mobilizes organizational resources and efforts for aggressive competitive engagement (Hambrick *et al*., 1996).

Action aggressiveness

Competitive dynamics research has identified a set of variables to characterize competitive moves, and

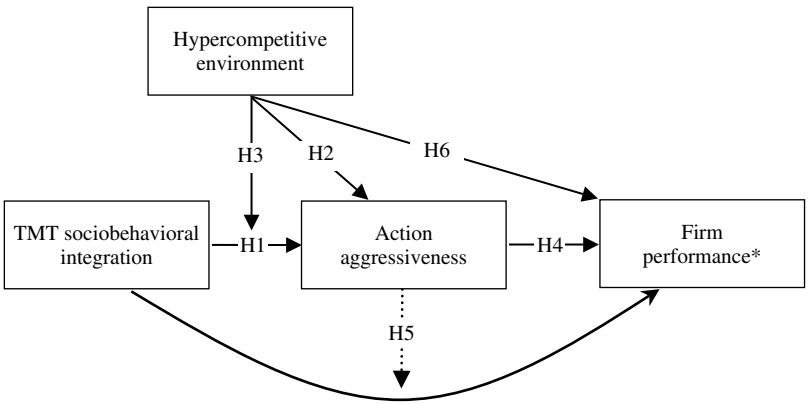

Figure 1. The research model
*For H6, firm performance represents variation in performance rather than level of performance.

DOI: 10.1002/smj

action volume and speed have emerged as key variables of interest because of their consistent performance implications (Smith *et al*., 2001). Action aggressiveness reflects how a firm engages rivals in a hypercompetitive environment. It is a firm-level construct that characterizes a firm's tendency to initiate actions and the firm's agility in doing so. A firm is said to have a high degree of action aggressiveness if it has rapidly taken a large number of actions. The integrated consideration of both action volume and speed is essential for revealing the nuance of hypercompetition and temporary advantage. Complementing previous industry-level studies (e.g., Wiggins and Ruefli, 2005), action aggressiveness represents a fine-grained investigation at the micro firm-behavior level.

Our perspective is that the phenomenon of temporary advantage is one that demands action aggressiveness if a firm is to be successful. In the context of temporary advantage, however, action aggressiveness is necessary, but not sufficient. Some actions may give rise to temporary advantage, while other actions may fail to do so. We can be sure that those firms not taking action will be destined for mediocrity at best, as any advantage they might have held will surely be dissipated and competed away. If a firm is able to string together a series of temporary advantages, it will display a sustained period of high performance (MacMillan, 1989), but it must be acknowledged that such performance is the result of a series of temporary advantages rather than the perpetuation of sustainable advantage.

TMT sociobehavioral integration

Competitive dynamics research has established the link between TMT dynamics and competitor behavior. Hambrick *et al*. (1996) found that demographic heterogeneity among TMT members facilitated proactive actions but hindered response behavior, resulting in significant response lag. From the awareness-motivation-capability (AMC) perspective (Chen, Su, and Tsai, 2007), TMT dynamics is important because it taps into the capability component of a firm's competitive behavior. With a few recent exceptions (e.g., Ling *et al*., 2008), the influence of TMT dynamics on organizational processes and outcomes has attracted far less interest than the impact of TMT demographical characteristics. In line with the upper echelons perspective (Hambrick and Mason, 1984), we consider TMT sociobehavioral integration a critical determinant of the firm's evaluation of its environment and of its strategic choices. The action a firm initiates to challenge its rivals is clearly a strategic choice, and how TMT dynamics shape the firm's enactment of its environment and its engagements with rivals is consequential for performance (Hambrick *et al*., 1996).

TMT sociobehavioral integration reflects how well senior executives of a firm work together, both socially and as a team. Social integration reveals psychological attachment among team members (O'Reilly, Caldwell, and Barnett, 1989) and characterizes key team processes (Smith *et al*., 1994), including social interaction and cohesion. Research has shown that TMT behavioral integration is critical in predicting team behavior and performance (Ling *et al*., 2008; Ensley and Pearce, 2001). Our focus corresponds to the growing interest in this construct in the TMT literature (Simsek *et al*., 2005). Our conceptualization, which includes both social and behavioral components of team integration, is a refinement of this construct. Both components are essential and can be difficult to disentangle (Zaccaro and McCoy, 1988).

Hypercompetitive environment and temporary advantage

An explicit consideration of environment, or the competitive context that defines a firm's engagements with its rivals, is important in the study of hypercompetition. Prior work has asserted that factors contributing to hypercompetition include the reduction in entry barriers through global competition, technological revolutions which shorten design cycles and offer opportunities for disruption, and improved methods of information dissemination which allow quick imitation (Bettis and Hitt, 1995). Empirical findings associated with hypercompetition have been mixed. McNamara *et al*. (2003) found little evidence of hypercompetition in a study of business unit ROA, mortality rates, and industry-level dynamism. Makadok (1998) failed to discover support for hypercompetition in a study of money market mutual funds despite seemingly easily imitated innovations. Conversely, Thomas (1996) found evidence of increasing hypercompetition as growth in stock market valuations revealed greater intraindustry variations over time and resource expenditures

DOI: 10.1002/smj

such as marketing and R&D became positively valued by the market in later time periods. Recent studies found evidence supporting hypercompetition as reflected in the inability to sustain above average financial performance (Wiggins and Ruefli, 2005) and an increase in within-industry heterogeneity of returns and greater firm volatility around long run performance (Thomas and D'Aveni, 2009).

Hypercompetition is a multifaceted concept, and our research focuses on its external, contextual manifestations. We define the intensity of a hypercompetitive environment as the degree of volatility in basic areas such as customer demands and production methods in the industry in which a firm competes. Hypercompetition concerns a degree of uncertainty that 'produces deficits in the information needed to identify and understand cause-and-effect relationships' (Sirmon, Hitt, and Ireland, 2007: 275). Disequilibrium is the norm, as managers, ignorant of what they do not know (Kirzner, 1997), strive for temporary advantage through active market engagement. Information deficits result in varying degrees of awareness of the pace and scope of change among different industry players, gaps that often 'create[s] opportunities for entrepreneurial actions that might have significant payoffs in the future' (Koka, Madhavan, and Prescott, 2006: 724). Those firms taking actions to secure a series of temporary advantages give themselves the opportunity for success and high performance (MacMillan, 1989; D'Aveni, 1994).

Moreover, there has been long-standing interest in examining the relationship between environment and performance, albeit with inconclusive results (Keats and Hitt, 1988; Datta, Guthrie, and Wright, 2005; Misangyi *et al*., 2006). We believe such discrepancies are due to the lack of attention to potential strategy and organizational factors that lie between a firm's environment and its ultimate performance. Our study, consistent with Sirmon *et al*. (2007), takes the position that the consideration of the role of action aggressiveness (and its antecedent, TMT sociobehavioral integration) is critical in the study of the hypercompetitive environment-performance relationship and should help explain previous inconclusive findings.

Finally, a number of studies have stressed the importance of complementing objective indicators with a perceptual evaluation of competition (Reger and Huff, 1993; Jayachandran, Gimeno, and Varadarajan, 1999). Relatively few, however, have applied the hypercompetition and competitive dynamics perspectives to examine the sources, meanings, and consequences of TMT perceptions within a competitive context. Similarly, the environment lends itself to both objective (Ferrier, 2001) and perceptual (Reger and Huff, 1993) considerations. Although each is essential to the overall evaluation of firm environment, this study's focus is on the perception of hypercompetitive environment. As noted by Cyert and March (1963: 325), 'the environment is *enacted* through executives' attention to segments of the environment.' We view strategists' evaluation of a firm's competition and environment as a critical determinant of the firm's actual engagements with its rivals and of ultimate performance (Chen *et al*., 2007).

HYPOTHESES

Figure 1 provides an overview of the research model. Two sets of hypotheses are developed, with the first set examining the role of sociobehavioral integration and hypercompetition as determinants of a firm's action aggressiveness (Hypotheses 1–3). The second set explores the performance implications of action aggressiveness along with its role as a mediator (indicated by a dotted line) in the relationship between TMT sociobehavioral integration and firm performance (Hypotheses 4–5). Finally, to flesh out the idea of temporary advantage, Hypothesis 6 relates the hypercompetitiveness of the environment to the variation in performance.

Predicting action aggressiveness

TMT integration

Sociobehavioral integration fosters mutual trust and information sharing (Ensley and Pearce, 2001) and increases team interactions (Smith *et al*., 1994). A TMT with high sociobehavioral integration will be capable of taking, in a timely manner, a great number of actions in a rivalry situation. Research has shown that integrated TMTs are more likely to resolve cognitive conflict quickly (Ensley and Pearce, 2001) and perform well in ambiguous contexts (Eisenhardt and Bourgeois, 1988). Because of the high stakes and lack of established

DOI: 10.1002/smj

rules, initiating competitive actions—especially creative or novel ones—may generate substantial team conflict (Hambrick *et al*., 1996) and demands great coordination and collaboration (Smith *et al*., 1994). An integrated TMT is likely to meet such demands by reducing the organizational costs of negotiation and monitoring (Smith *et al*., 1994). All of the organizational and team benefits associated with high TMT sociobehavioral integration enhance a firm's ability to launch decisive and swift attacks against rivals.

In contrast, members of a low-integration TMT tend to focus more on group maintenance issues rather than task-oriented behaviors (Eisenhardt and Bourgeois, 1988), reducing action propensity. Such a TMT is less capable of taking initiatives to challenge rivals, as it is often unable 'to engage in the internal exchange, collaboration, and mutual adjustments required to formulate and execute corporate-wide action' (Hambrick, 1995: 116).

Hypothesis 1: TMT sociobehavioral integration will relate positively to action aggressiveness.

Hypercompetitive environment

A hypercompetitive environment creates uncertainty and perceptual variation among industry players, who tend to have different interpretations and understandings of the nature, scope, pace, (Sutcliffe, 1994), and long-term viability (Dean and Sharfman, 1996) of changes. They also differ sharply in their recognition of various opportunities and paths for growth. Indeed, as the intensity of a hypercompetitive environment increases, the relevance of industry recipes declines (Koka *et al*., 2006). A firm competing in this kind of environment is propelled to act constantly and quickly to secure a series of temporary advantages (D'Aveni, 1994). A hypercompetitive environment may serve as a *variety mechanism* and inspire a firm to take speedy actions with the hope of changing its position in the industry (Koka *et al*., 2006). Given this level of volatility (Thomas and D'Aveni, 2009), temporary opportunities are discovered (rather than planned) and seized through active engagement in the market (Roberts and Eisenhardt, 2003). Hambrick and Finkelstein (1987) suggested that industry dynamism expands a firm's views and options in strategic adaptation. The high intensity of a hypercompetitive environment escalates the level of competition which, in turn, induces the firm to take offensive actions and expand its competitive repertoire (Sirmon *et al*., 2007; D'Aveni, 2010). Miller and Chen (1994) found that market volatility is associated with the reduction of competitive inertia.

Hypothesis 2: The more hypercompetitive the environment, the greater a firm's action aggressiveness.

The moderating role of hypercompetitive environment

Besides the independent effects of TMT sociobehavioral integration and hypercompetition on action aggressiveness, there are likely to be interaction effects. Specifically, we expect the relationship between TMT integration and action aggressiveness to be stronger in a hypercompetitive environment. Central to the upper echelon perspective is the idea that TMT characteristics and capabilities need to be commensurate with the requirements of their environment (cf. Carpenter, Geletkanycz, and Sanders, 2004). A volatile, or hypercompetitive, environment is associated with conflicting signals and noise, as well as information deficits (Sirmon *et al*., 2007); as a result, a firm's executives tend to form different perceptions of the firm's environment. Such an environment is characterized by a lack of clear-cut rules and means-end links, making it difficult for TMT members to achieve coherent interpretations of environmental signals (Ocasio, 1997). This diversity in environmental stimuli and the breakdown of traditional industry recipes or patterns of behavior in the face of temporary advantage (Koka *et al*., 2006; D'Aveni, 1994) can elevate interpersonal and team conflict and mitigate a TMT's integrated capability to initiate entrepreneurial actions (Cho and Hambrick, 2006). However, it is exactly under such conditions, as firms strive for temporary advantage, that team integration is required to achieve coherence and make decisive moves against rivals. While top team sociobehavioral integration is favorable for competitive aggressiveness, it is under conditions of hypercompetition that such integration becomes imperative in overcoming extensive environmental noise and divergent perspectives to engage one's rivals. By way of contrast, under more tranquil conditions top team integration is facilitative of executing competitive actions but less imperative as there

DOI: 10.1002/smj

exists well understood means-ends linkages around which decisions may coalesce.

Hypothesis 3: A hypercompetitive environment will positively moderate the relationship between TMT sociobehavioral integration and action aggressiveness.

Predicting firm performance

Action aggressiveness and firm performance

In a hypercompetitive environment, to ensure survival and prosperity, a firm is compelled to take actions with the hope of creating a series of temporary advantages (D'Aveni, 1994). Equally, competitive dynamics research has established a consistent, positive link between action volume (and speed) and firm performance (Smith *et al*., 2001). A firm that tends to act frequently and speedily in the marketplace is likely to capture business opportunities and secure first mover advantage (Schumpeter, 1950). Although the results are far from certain, taking action in an era of temporary advantage yields a better probability of success than does taking no action. Research has shown that a firm that initiates more actions faster than its rivals is more likely to impede its rivals' behaviors and enhance its own performance (Hambrick *et al*., 1996). Action aggressiveness, as well as related concepts such as propensity and responsiveness (Chen and Hambrick, 1995), has been found to be positively related to firm profitability (Young *et al*., 1996) and market share (Chen and MacMillan, 1992; Ferrier *et al*., 1999).

Hypothesis 4: Action aggressiveness will relate positively to firm performance.

The mediating role of action aggressiveness

Recent reviews on the upper echelons perspective have noted that research has produced inconclusive results in linking TMT concerns and firm performance (Carpenter *et al*., 2004). The gaps in the research are due to the lack of attention to potential organizational mediators that lie between the apex of a firm and the firm's ultimate performance: 'at the heart of the theory is the portrayal of upper-echelons' characteristics as determinants of strategic choices and, *through these choices*, of organizational performance' (Hambrick and Mason, 1984: 197, emphasis added). Thus, it is critical to go beyond direct effects of the TMT-performance relationship and consider the strategic choices that mediate this relationship. Although a few researchers have explored performance implications of TMT integration (Smith *et al*., 1994; Ensley and Pearce, 2001), they have not systematically examined the mediating roles of strategic choices (e.g., engagements with rivals) within the broad context of TMT sociobehavioral integration and the firm-performance link.

Research has shown that TMT sociobehavioral integration may yield conflicting influences on firm performance (Smith *et al*., 1994). On the one hand, intense social relationships, often manifested among members of a TMT with high sociobehavioral integration, may suppress task focus, override organizational needs with interpersonal concerns, and increase the likelihood of making irrational decisions that are not in the best interest of the firm (Esser, 1998). All of these symptoms of groupthink (Janis, 1972) will hurt organizational performance. On the other hand, high sociobehavioral integration may produce positive outcomes, as TMT members enjoy information sharing, constructive dialogue, and debate, resulting in effective and timely decisions in competitive engagements and positive performance outcomes (Amason, 1996; Hambrick, 1994).

In light of these contrasting findings, our prediction is that TMT sociobehavioral integration will enhance firm performance indirectly, through its increase in action aggressiveness (Hypothesis 2) and a firm's capability to decisively engage its competitors. Competitive dynamics research has established a positive link between action volume (and speed) and firm performance (Smith *et al*., 2001), as proposed in Hypothesis 3. It is through this contribution to action aggressiveness that the performance aspect of TMT integration will be manifest. Moreover, we predict that the intensity of the hypercompetitive environment will moderate action aggressiveness' mediating effect. Because of the volatility and dynamism of a hypercompetitive environment and the need for greater aggressiveness, the indirect effect of TMT integration on performance will be stronger for firms in hypercompetitive environments. Such firms, operating in the most challenging environments, will benefit noticeably from the contribution of TMT sociobehavioral integration to action aggressiveness.

DOI: 10.1002/smj

Hypothesis 5a: A firm's action aggressiveness will fully mediate the relationship between TMT sociobehavioral integration and firm performance.

Hypothesis 5b: The mediation effect of action aggressiveness on TMT sociobehavioral integration and firm performance will be stronger under conditions of a hypercompetitive environment.

Performance variation and temporary advantage

Central to the hypercompetitive environment are dynamism and disequilibrium. In such an environment, there is high volatility in customer preferences, fluctuation in production methods, and fast-changing competitive tactics leading to uncertainty about what is required for success (D'Aveni, 2010). Firm performance is highly volatile as temporary advantages are exploited and then dissipate, and one strategic oversight could force a firm to concede its leadership position to opponents.

Recent studies have demonstrated an increase in industry volatility and intraindustry performance variation among U.S. firms (Thomas and D'Aveni, 2009; Comin and Philippon, 2006). This variation will be most salient within a hypercompetitive context. Indeed, temporary advantage is the reality within a hypercompetitive environment, and firms competing in such an environment will experience a high degree of performance variation. As such, we propose greater performance variation among firms within hypercompetitive environments in comparison to their counterparts in less hypercompetitive environments. Specifically, we expect to observe greater intraindustry variation in firm performance for industries within a hypercompetitive context, as well as greater volatility over time.

Hypothesis 6: A hypercompetitive environment will be positively associated with variation in firm performance.

METHODS

Sample and data collection

For our sample, we randomly selected 1,000 firms from Taiwan's largest (in sales) 5,000 firms in 2003. A highly competitive and dynamic environment, Taiwan is a significant player in the global economy, ranking fourth in its foreign reserves, as the sixth largest trading partner of the United States, and first in its chip foundry service and semiconductor packaging, as well as in the manufacturing of notebook PCs, LCD monitors, cable modems, PDAs, and wireless LAN equipment (Einhorn *et al*., 2005). Taiwan's cultural and economic differences, particularly in comparison to the U.S., also make it well suited for exploring the generalizability of hypercompetition across borders. Taiwan's Chinese cultural context, characterized as high on collectivism and power distance (Hofstede, 1980) and in which interpersonal and interfirm 'guanxi' or connections are stressed (Xin and Pearce, 1996), presents a distinctive platform from which to examine the role of TMT dynamics in a hypercompetitive environment.

We first sent letters to CEOs of the 1,000 selected firms, outlining the study and inviting their participation. If the CEO agreed to his/her company's participation, anonymous questionnaires were mailed to TMT members (the CEO and all senior executives who report directly to him/her, as identified by the CEO). The questionnaire was professionally produced and distributed (with three follow-ups). To reduce single response bias and follow TMT research convention (Amason, 1996), we excluded single respondent firms and included in our sample only those with two or more responses. The sample used in this study, as part of our comprehensive survey, includes 281 executives from 104 firms.[1]

The sample firms have average assets of $273.41 million and an average age of 25.68 years. The average TMT age and tenure are 47.45 and 13.42 years, respectively. As the average TMT size is 10.6 and the average number of members on respondents' teams is 2.7,[2] we checked potential

[1] Our full sample includes a total of 628 executives in 254 firms who participated in the survey (25.40% response rate at the firm level and 20.69% at the individual level). These response rates are notably higher than those found in prior TMT research (Hambrick, 1995). A large number of sample firms are privately held, and objective performance information is unavailable. To ensure the validity of our findings, the sample used here includes only public firms. Prior survey-based TMT research typically had less than 100 firms/teams (e.g., Simons, Pelled, and Smith, 1999).

[2] This somewhat low response rate among top management teams is due to the general difficulty in collecting information from top executives (Hambrick, 1995) and the challenge of soliciting multiple executive responses in Taiwan (Jaw and Liu, 2003).

respondent bias by comparing responding and nonresponding TMT members and found insignificant differences in age ($\chi^2 = 0.13$, df = 1, p = 0.71) and tenure ($\chi^2 = 2.31$, df = 1, p = 0.13) when we compared these two groups.

We also checked possible nonresponse bias in our sample by comparing the differences between early and late respondents in their ratings of key variables used in this study (Datta *et al*., 2005). The t-test results were all insignificant ($p > 0.05$). Moreover, we performed χ^2 tests, comparing our sample and the population in organizational characteristics such as number of employees ($\chi^2 = 1.47$, df = 1, p = 0.23) and public ownership (listed/unlisted in the stock market) ($\chi^2 = 0.08$, df = 1, p = 0.77) and found no significant differences.[3]

Measures

Survey questions were derived from the literature and in-depth interviews with six Taiwanese executives in diverse industries. The questionnaire was originally designed in English and then translated into Chinese by two management scholars competent in both languages. To avoid cultural bias and ensure validity, the Chinese version was translated back into English by two language professionals, and special attention was paid to detecting misunderstandings because of translation. We involved 20 additional strategy scholars and executives to participate in a pilot survey and evaluate the definitions of studied variables and their respective items; thus we validated the accuracy of our measurements.

Hypercompetitive environment

We evaluated a hypercompetitive environment using a four-item, seven-point Likert-type measure derived from D'Aveni (1994). These items (listed in the Appendix) ($\alpha = 0.92$) evaluated whether respondents agreed, on a scale from 1 (completely disagree) to 7 (completely agree), with such statements as: 'My company operates in an industry where head-to-head rivalry is common' and 'My company operates in an industry where cause-and-effect relationships in the environment are often difficult to discern.' Because the responses of individual team members were aggregated into firm-level data, we needed to assess interrater reliabilities. We used three methods to do so: ICC, $r_{WG(J)}$, and ANOVA (Kirkman *et al*., 2004). The results of ICC(1) and ICC(2) were 0.43 and 0.67, indicating that responses from the same team are consistent, and team-level means appear stable (Bliese, 2000).[4] The mean $r_{WG(J)}$ across all teams was 0.95, showing high within-group agreement (James, Demaree, and Wolf, 1993). ANOVA results ($F = 3.06$, $p < 0.001$) offer additional support.

Action aggressiveness was characterized as the relative number and speed of actions a firm takes, in comparison to the firm's direct rivals, over time and across different types of competitive moves. Research has shown the most frequently launched types of moves include market expansion, new product introductions, new service offerings, new marketing campaigns, price changes, capacity-related moves, and signaling (Smith *et al*., 2001).[5] We included the first three types of actions because they were representative of a firm's strategic competitive behavior and involved the entire TMT in Taiwan, according to the feedback we received from our pilot survey. We assessed this variable using a self-report measure, in which action volume and speed were measured with three items, respectively. The six-item, seven-point Likert-type scale ($\alpha = 0.96$) ranging from 1 (far fewer or far slower than direct competitors) to 7 (far more or far faster than direct competitors) was developed from Smith *et al*. (2001) and Ferrier *et al*. (1999). The correlation coefficient between action volume and action speed is 0.84. Checks for aggregation yielded acceptable values (ICC(1) = 0.43, ICC(2) = 0.68; mean $r_{WG(J)} = 0.94$; $F = 3.06$, $p < 0.001$).

To validate the action aggressiveness measure, we collected information from key industry informants, who rated a given firm's action volume

[3] Although these findings suggest that there was no significant nonresponse bias in our sample, it is still possible that responding and nonresponding firms differed on other unmeasured variables that correlated with our studied variables. We also cannot exclude the possibility that high-integration TMTs responded while low-integration TMTs did not.

[4] James (1982) reported that ICC(1) values generally ranged between 0 and 0.50, with a median of 0.12. Conversely, Glick (1985) suggested ICC(2) values be higher than 0.60. Our ICC(1) and ICC(2) values are within the acceptable thresholds (also see Bliese, 2000).

[5] It should noted that due to the lack of credible outlets that could report and cover competitive events consistently across different industries in Taiwan, we were not able to identify sample actions through archival sources, as in previous competitive dynamics studies conducted primarily in the United States.

DOI: 10.1002/smj

and speed as compared to its direct rivals (Chen, Farh, and MacMillan, 1993). Sixteen informants to which we had direct access agreed to participate in this additional study. The minimum industry tenure of these informants was 10.5 years, with an average of 16.3 years. We asked these informants to rate the relative number and rapidity of actions of four or five firms for which they were most knowledgeable. Sixty-four of the sample firms were included, with each rated by two to six informants. Interrater reliabilities among raters were all acceptable (ICC(1) = 0.26, ICC(2) = 0.59; mean $r_{WG(J)}$ = 0.83; F = 2.42, p < 0.001). The correlation between the ratings of these industry informants and our original executive respondents was significant (p < 0.05). Overall, the measure of action aggressiveness showed good construct validity.

TMT sociobehavioral integration

Adapting from Smith *et al*. (1994), Simsek *et al*. (2005), and Tsui and Farh (1997), we measured this variable by two subscales: three-item interpersonal interaction and five-item task-related interaction. Each item was measured by a seven-point Likert-type scale ranging from 1 (completely disagree) to 7 (completely agree). Sample items include: 'Members of the top management team in my company are ready to help each other complete jobs and meet deadlines' (for task-oriented interaction) and 'Members of the top management team in my company enjoy cultivating personal connections with each other' (for interpersonal interaction). Cronbach's α for the scale is 0.93. Checks for aggregation yielded acceptable results (ICC(1) = 0.35, ICC(2) = 0.60; mean $r_{WG(J)}$ = 0.92; F = 2.48, p < 0.001).

Firm performance

We used two widely accepted measures of financial performance: profit margin and return on equity (ROE) (Venkatraman and Ramanujam, 1986). Data were accessed from China Credit Information Service, Taiwan's leading credit information and reporting agency. Profit margin is defined as operating profit divided by operating revenue, while ROE is defined as net profit divided by equity. To control for temporal fluctuations (Subramaniam and Youndt, 2005), we used three-year average profit margin and ROE subsequent to our survey to characterize a firm's performance outcomes.[6]

Control variables

We controlled for key TMT demographical variables such as team size, average age, and educational heterogeneity (using a variation of the Herfindahl-Hirschman Index, $H = 1 - \sum_{i=1}^{n} p_i^2$, in which H is the heterogeneity measure, p is the percentage of TMT members in each of the educational (n = 3) categories (Hambrick *et al*., 1996). We also controlled for firm characteristic variables such as firm size (logarithm of firm capital) and age (logarithm of the number of years since founding) (Miller and Chen, 1994). As competitive behavior may depend on resource availability, we controlled for three measures of organizational slack: current ratio or the availability of current assets over current liabilities, equity/debt ratio as an indicator of potential slack through unused borrowing capacity, and prior (t-1) performance as an indicator of recent profitability (profit margin or ROE) (Hambrick and D'Aveni, 1988).

Measurement properties and analyses

We used AMOS 5.0 to conduct a confirmatory factory analysis (CFA) to evaluate all survey items. The three latent variables (TMT sociobehavioral integration, hypercompetitive environment, and action aggressiveness) were included in one multifactorial confirmatory factor analysis model. Following the procedures suggested by Anderson and Gerbing (1988), the final model shows a good model fit; fit indices are all within acceptable thresholds (χ^2 = 183.99, df = 127, χ^2/df = 1.45; RMSEA = 0.07; SRMR = 0.06; NNFI = 0.96; and CFI = 0.97). Further, all items loaded significantly on their respective latent constructs, indicating convergent validities.

[6] We also employed perceptual performance data to test the hypotheses. In the survey, we asked each respondent to compare his/her firm's performance to its direct rivals over a three-year period. The five seven-point Likert-type items ranging from 1 (far worse than direct rivals) to 7 (far better than direct rivals) were adapted from Garg, Walters, and Priem (2003), including profitability, sales-growth rate, market-share-growth rate, return on asset (ROA), and overall firm performance (α = 0.95). Checks for aggregation showed acceptable results (ICC(1) = 0.62, ICC(2) = 0.82; mean $r_{WG(J)}$ = 0.92; F = 5.48, p < 0.001). These results are consistent with those examined using the objective performance data reported here.

DOI: 10.1002/smj

To establish the discriminant validity of the constructs, we calculated the average variance extracted (AVE) and composite reliability of each construct (Fornell and Larcker 1981). AVE values ranged from 0.68 to 0.84, above the 0.50 threshold. AVE values also were found to surpass the corresponding shared variance for all possible pairs of constructs (Anderson and Gerbing 1988). Further, the values of construct reliabilities, ranging from 0.92 to 0.96, were above the acceptable level of 0.70.

Given our reliance on self-reported measures for some of our variables, we took several actions to mitigate the possible influence of common method variance (CMV) (Podsakoff and Organ, 1986). To mitigate the CMV bias, we first varied the scale anchors and format in the questionnaire, performed a series of scale-validation processes before distributions, and invited inside informants (top executives) to rate the measures. Second, we collected the measured data from multiple responses per firm and assured their interrater reliabilities. Third, we controlled a few potentially influential factors in the model (Podsakoff *et al*., 2003).

In further effort to detect the CMV effects, we first conducted exploratory factor analysis on all of the measured items. The rotated component matrix showed that all of the measurement items loaded onto their respective factors, presenting evidence of construct validity (Stam and Elfring, 2008). Second, as shown above, the collected information from industry experts showed significant correlations with the measures of action aggressiveness. Finally we note that for performance analyses, the dependent variable is objective and obtained from a financial reporting agency, further minimizing CMV concerns.

To test our hypotheses, we used hierarchical regression analysis. To test for interaction effects, we first mean-centered our TMT sociobehavioral integration and hypercompetitive environment and then created a multiplicative term between the two mean-centered variables.[7] We used several regression diagnostics to assess whether modeling assumptions were satisfied. The univariate normality assumption was supported by conducting a Kolmogorov-Smirnov test.

RESULTS

Table 1 reports means, standard deviations, and correlations for all variables used in this study. The table provides evidence suggesting the merit of further evaluations. Hypercompetitive environment and TMT sociobehavioral integration, for instance, have significant correlations with action aggressiveness ($p < 0.01$). The two performance variables also significantly correlate with TMT sociobehavioral integration and action aggressiveness ($p < 0.05$). Examination of the independent variables shows a high correlation of 0.71 among the two control variables of prior ROE and equity/debt ratio. To address this potential multicollinearity issue, we examined the variance inflation factors (VIF) for all regressions below. Among all regressions, the range of VIF values was 1.02 to 1.93. These results were well within acceptable guidelines and suggest no serious problem of multicollinearity in the study.

Table 2 presents the regression results showing the effects of the antecedents of action aggressiveness. Several models are estimated, with Models 1 to 5 controlling for prior (t-1) profit margin and Models 6 to 10 controlling for prior (t-1) ROE. These models test Hypotheses 1–3.

Hypothesis 1 proposed that a firm's TMT sociobehavioral integration would be positively associated with its action aggressiveness. As shown in Model 2 and Model 7, the coefficients for TMT sociobehavioral integration are positive and significant (Model 2: $\beta = 0.30$, $p < 0.01$; Model 7: $\beta = 0.33$, $p < 0.01$). The results remain moderately significant after controlling for hypercompetitive environment, as shown in Models 4 and 9 (Model 4: $\beta = 0.16$, $p < 0.10$; Model 9: $\beta = 0.17$, $p < 0.10$). Overall, Hypothesis 1 is supported. Hypothesis 2 states that the more hypercompetitive the environment, the more likely a firm will be to engage in a high degree of action aggressiveness. Hypothesis 2 is clearly supported, as shown in Table 2, Model 3, and Model 8, with the positive and statistically significant coefficients for hypercompetitive environment (Model 3: $\beta = 0.48$, $p < 0.01$; Model 8: $\beta = 0.57$, $p < 0.01$). Hypothesis 3

[7] We also considered the possibility of using structural equation modeling (SEM) to analyze our hypotheses. However, to control for common method variance, we required firms to have publicly available financial information, which limited the sample size to 104 firms and made SEM inappropriate for statistical reasons (Ding, Velicer, and Harlow, 1995). We did conduct a SEM analysis of key elements of our model using Lisrel 8.3 on a larger sample including firms without objective financial data; the results were largely consistent with the regression results reported here.

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

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13
1. TMT sociobehavioral integration	5.64	0.74													
2. Action aggressiveness	4.62	0.85	0.27**												
3. Hypercompetitive environment	4.77	1.00	0.30**	0.43**											
4. Profit margin	4.41	18.56	0.22*	0.20*	0.14										
5. Return on equity	5.71	16.94	0.28**	0.30**	0.12	−0.01									
6. TMT size	10.60	6.28	0.03	0.04	0.03	0.17+	0.12								
7. TMT average age	47.45	5.33	0.08	0.01	0.32**	−0.03	−0.07	−0.21*							
8. TMT educational heterogeneity	0.39	0.17	−0.12	−0.04	0.06	0.04	0.07	−0.03	0.02						
9. Firm age[b]	0.16	0.16	0.05	0.04	0.01	−0.06	−0.01	−0.02	0.37**	0.04					
10. Firm size[b]	25.68	14.79	0.04	0.20*	0.09	0.01	−0.02	−0.12	0.02	−0.03	−0.07				
11. Profit margin (t-1)	6.08	0.56	0.16+	−0.10	−0.11	0.15	0.04	−0.05	0.15	0.12	0.12	−0.13			
12. Return on equity (t-1)	8.19	15.39	0.27**	−0.01	−0.03	0.12	0.12	−0.06	0.20+	0.05	0.17+	0.18+	0.28**		
13. Slack (equity/debt)	0.65	0.13	0.12	0.05	−0.01	−0.06	−0.01	0.01	0.16+	0.08	0.07	0.32**	0.57**	0.71**	
14. Slack (current ratio)	1.10	0.35	−0.04	−0.09	−0.05	0.03	0.04	−0.02	0.06	0.02	0.08	0.44**	0.05	−0.01	−0.19+

[a] N = 104, except for ROE and ROE (t-1) N = 91. + p < 0.10; * p < 0.05; ** p < 0.01.
[b] Logarithm.

argued that a more hypercompetitive environment will display a stronger association between TMT integration and action aggressiveness. The coefficients for the interaction between hypercompetitive environment and TMT integration on action aggressiveness, as seen in Table 2, are positive and statistically significant in Model 10 and marginally significant in Model 5 (Model 5: $\beta = 0.17$, $p < 0.10$; Model 10: $\beta = 0.21$, $p < 0.05$). Thus, Hypothesis 3 is supported.

To reveal further the patterns of the significant moderating effect of hypercompetitive environment, we present the interaction plot in Figure 2 using one standard deviation above and below the mean to capture high and low hypercompetitive environment. As indicated in Figure 2, high hypercompetitive environment displays a much stronger positive effect of TMT sociobehavioral integration on action aggressiveness. Conversely, TMT integration has very little influence on action aggressiveness under a less hypercompetitive environment.[8]

Table 3 presents the regression results for Hypotheses 4 and 5a that predict direct and mediating effects of a firm's action aggressiveness on performance. As evident in Table 3, Hypothesis 4 is supported, as a firm's action aggressiveness shows a positive and significant association with return on equity and is moderately significant with profit margin (Model 4: $\beta = 0.19$, $p < 0.10$; Model 8: $\beta = 0.27$, $p < 0.05$).

To examine the mediating effect of action aggressiveness on TMT integration and performance as proposed in Hypothesis 5a, we follow the procedure outlined by Baron and Kenny (1986). They proposed that a mediating effect exists when (1) the studied independent variables and presumed mediators each significantly account for the variations in the dependent variable; (2) the studied independent variables significantly account for the variations in the presumed mediators; and (3) the effects of the independent variables on the dependent variable are reduced significantly or even eliminated when the presumed mediators are incorporated into the examined model. Condition 1 is met, as both TMT integration and action aggressiveness are significantly related to performance in Table 3. Condition 2 is satisfied,

[8] Figure 2 presents the interaction results by including profit margin as the control for prior performance. The results are consistent if we substitute ROE as the control for prior performance.

Table 2. Regression results of TMT sociobehavioral integration and hypercompetitive environment on action aggressiveness[a]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
TMT size	0.06	0.05	0.00	0.00	−0.02	0.12	0.13	0.07	0.08	0.04
TMT average age	0.00	−0.02	−0.20^{+}	−0.18^{+}	−0.20^{+}	0.04	0.02	−0.19^{+}	−0.17	−0.20^{+}
TMT educational heterogeneity	−0.02	0.02	−0.06	−0.04	−0.02	0.03	0.06	0.00	0.02	0.05
Firm age[b]	0.07	0.07	0.12	0.12	0.10	0.03	0.04	0.09	0.09	0.07
Firm size[b]	0.22^{+}	0.23*	0.16	0.17	0.20^{+}	0.19	0.21^{+}	0.11	0.12	0.15
Profit margin (t-1)	−0.18	−0.23^{+}	−0.12	−0.16	−0.15					
Return on equity (t-1)						−0.04	−0.13	0.00	−0.05	−0.05
Slack (current ratio)	0.03	0.04	0.03	0.04	0.08	−0.02	−0.02	0.01	0.01	0.05
Slack (equity/debt)	0.08	0.08	0.13	0.13	0.14	0.03	0.05	0.03	0.04	0.08
TMT sociobehavioral integration		0.30**		0.16^{+}	0.13		0.33**		0.17^{+}	0.11
Hypercompetititve environment			0.48**	0.42**	0.40**			0.57**	0.52**	0.52**
TMT integration × hypercompetition					0.17^{+}					0.21*
N	104	104	104		104	91	91	91	91	91
R^2	0.07	0.15	0.26	0.28	0.30	0.04	0.14	0.32	0.34	0.38
R^2 change[c]		0.08	0.19	0.13	0.03		0.10	0.28	0.21	0.04

[a] Standardized regression coefficients are shown. $^{+}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$.
[b] Logarithm.
[c] Values are rounded to 0.01 when necessary. Because of rounding, values of R^2 change may not exactly equal to the R^2 differences between models.

Table 3. Regression results of TMT sociobehavioral integration and action aggressiveness on firm performance[a]

Variables	Profit margin				Return on equity			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
TMT size	0.17^{+}	0.17^{+}	0.17^{+}	0.17^{+}	0.12	0.13	0.09	0.10
TMT average age	−0.04	−0.03	0.00	0.01	−0.11	−0.09	−0.06	−0.05
TMT educational heterogeneity	0.02	0.05	0.04	0.06	0.07	0.10	0.07	0.10
Firm age[b]	−0.07	−0.08	−0.10	−0.10	−0.02	−0.02	−0.05	−0.05
Firm size[b]	0.02	0.03	−0.01	0.00	−0.02	0.01	−0.05	−0.03
Profit margin (t-1)	0.26*	0.23^{+}	0.29*	0.26*				
Return on equity (t-1)					0.25^{+}	0.17	0.25^{+}	0.18
Slack (current ratio)	0.02	0.03	0.01	0.02	−0.15	−0.15	−0.15	−0.15
Slack (equity/debt)	−0.14	−0.15	−0.17	−0.17	0.03	0.05	0.02	0.04
Hypercompetitive environment	0.16	0.10	0.06	0.02	0.16	0.08	−0.02	−0.06
TMT sociobehavioral integration		0.17^{+}		0.14		0.25*		0.21^{+}
Action aggressiveness			0.21*	0.19^{+}			0.31*	0.27*
N	104	104	104	104	91	91	91	91
R^2	0.10	0.12	0.13	0.15	0.08	0.13	0.14	0.18
R^2 change[c]		0.03	0.03	0.03		0.05	0.07	0.05

[a] Standardized regression coefficients are shown. $^{+}$ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.
[b] Logarithm.
[c] Values are rounded to 0.01 when necessary. Because of rounding, values of R^2 change may not exactly equal to the R^2 differences between models.

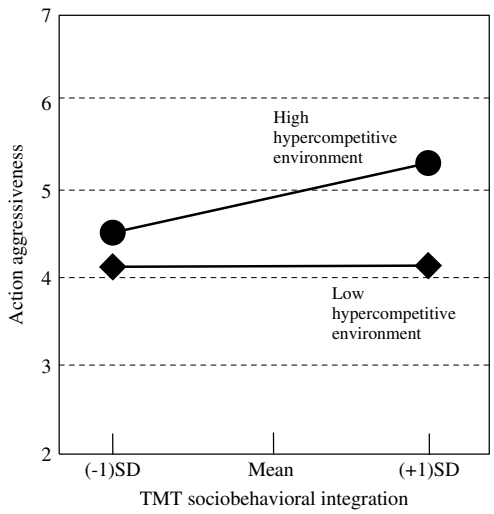

Figure 2. Moderating effect of hypercompetitive environment on the relationship between TMT sociobehavioral integration and action aggressiveness

as Table 2 showed that TMT integration was significantly related to action aggressiveness. And finally, Condition 3 is met, as Model 4 in Table 3 shows the full mediating role of action aggressiveness as the effect of TMT sociobehavioral integration on profit margin changes from marginally significant ($\beta = 0.17$, $p < 0.10$) to insignificant ($\beta = 0.14$, $p > 0.10$) when action aggressiveness is included. Model 8 in Table 3, however, shows a partial mediating effect because the coefficient of TMT integration changes from significant ($\beta = 0.25$, $p < 0.05$) to marginally significant ($\beta = 0.21$, $p < 0.10$) as action aggressiveness is added. Thus, Hypothesis 5a is partially supported, as action aggressiveness fully mediates the relationship between TMT sociobehavioral integration and profit margin, but only partial rather than full mediation is observed for firm ROE.

To examine Hypothesis 5b, we performed a mean split of the sample on the hypercompetitive environment variable. Table 4 presents results with Models 1–4 for firms in the highly hypercompetitive context and Models 5–8 for those firms in the less hypercompetitive context. Examining Table 4, Models 2 and 3 show that the coefficients of TMT sociobehavioral integration and action aggressiveness are positive and significantly related to profit margin in the hypercompetitive context ($p < 0.05$). Previously, Figure 2 revealed a significant relationship between TMT integration and action aggressiveness in the high hypercompetition context ($p < 0.05$). Finally, as shown in Table 4, the effect of TMT sociobehavioral integration on profit margin changes from significant (Model 2: $\beta = 0.36$, $p < 0.05$) to marginally significant (Model 4: $\beta = 0.26$, $p > 0.10$) when action aggressiveness is included in the model, demonstrating the partial mediating role of

DOI: 10.1002/smj

Table 4. Regression results of action aggressiveness as a mediator in hypercompetitive environment[a]

Variables	Profit margin							
	High hypercompetitive environment				Low hypercompetitive environment			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
TMT size	0.31*	0.27+	0.33*	0.29*	0.13	0.13	0.12	0.12
TMT average age	0.04	0.04	0.02	0.06	−0.10	−0.10	−0.07	−0.07
TMT educational heterogeneity	0.15	0.24+	0.18	0.22+	−0.04	−0.04	−0.04	−0.04
Firm age[b]	−0.02	−0.07	−0.01	0.06	−0.17	−0.17	−0.18	−0.18
Firm size[b]	−0.13	−0.04	−0.15	−0.09	0.27	0.27	0.25	0.25
Profit margin (t-1)	0.32+	0.28+	0.35*	0.34*				
Return on equity (t-1)					0.15	0.15	0.16	0.16
Slack (current ratio)	0.02	0.10	−0.19	0.08	0.04	0.05	0.05	0.05
Slack (equity/debt)	−0.08	−0.13	−0.03	−0.19	−0.13	−0.13	−0.14	−0.14
TMT sociobehavioral integration		0.36*		0.26+		−0.01		0.00
Action aggressiveness			0.35**	0.26+			0.09	0.09
N	54	54	54	54	50	50	50	50
R^2	0.23	0.33	0.34	0.39	0.11	0.11	0.11	0.12
R^2 change[c]		0.11	0.11	0.05		0.00	0.01	0.01

[a] Standardized regression coefficients are shown. + $p < 0.10$; * $p < 0.05$; ** $p < 0.01$.
[b] Logarithm.
[c] Values are rounded to 0.01 when necessary. Because of rounding, values of R^2 change may not exactly equal to the R^2 differences between models.

action aggressiveness. In contrast, under the low hypercompetitive environment context, the direct effects of TMT integration and action aggressiveness are all statistically insignificant and no mediating relationship is observed ($p > 0.10$). Hypothesis 5b is supported and provides additional evidence of the importance of the hypercompetitive environment and, how under such conditions, the beneficial performance influence of TMT integration operates partially through its contribution to a firm's action aggressiveness.

To test Hypothesis 6, or the relationship between hypercompetitive environment and performance variation, we classified the 104 sample firms into 40 industries based on the three-digit SIC code; 25 industries contained at least three firms. We conducted correlation analysis and found that the higher the average perceived hypercompetition within an industry, the higher the intraindustry variation in profit margin ($r = 0.40$, $p < 0.05$, $n = 25$) and ROE ($r = 0.46$, $p < 0.05$, $n = 22$).

We also collected additional performance data for the period from 2007 to 2009. For each firm, we calculated absolute difference in average performance between the focal 2004 to 2006 period and the 2007 to 2009 period. We then correlated this difference with the measure of hypercompetitive environment. Results revealed significantly higher performance difference in more hypercompetitive environments (for profit margin, $r = 0.215$, $p < 0.05$, $n = 92$; ROE, $r = 0.233$, $p < 0.05$, $n = 80$). As such, Hypothesis 6 is supported and revealing of temporary advantage, as both intraindustry performance variation and volatility over time are greater under hypercompetition.

DISCUSSION

Both hypercompetition and competitive dynamics research have sketched out an environment-action-performance link, although competitive dynamics devotes much less attention to the environmental context in which interfirm rivalry takes place. Our paper formalizes this link. More importantly, the study highlights the significant role of TMT dynamics in linking an area that neither of the two research streams has yet investigated systematically. Our research shows that to compete effectively in a hypercompetitive environment through aggressive action, as both these lines of work have advocated, a firm needs to have a highly integrated TMT in place.

This study first contributes to the literature on temporary advantage, an idea central to both hypercompetition and competitive dynamics. Re-

cognizing the Austrian school (Jacobson, 1992) as the common intellectual root, our article highlights the pivotal role that temporary advantage plays in integrating these two lines of work. Temporary advantage is the essence of hypercompetition, and scholars of this topic have long been interested in the investigation of the volatility and dynamism of business environments leading to temporary advantage (D'Aveni, 1994; Thomas and D'Aveni, 2009). Equally, the idea that competitive advantage is transient and any advantage a firm creates will be eroded over time as a result of rivals' reactions has been an implicit premise adopted by researchers in competitive dynamics (Chen and MacMillan, 1992).

Our research reveals the significance and implications of temporary advantage through the examination of two essential organizational mechanisms. Specifically, we show that it is a firm's moves and action aggressiveness, rather than its fortified positions, that shape its idiosyncratic performance outcome. Rather than focusing on temporary advantage as reflected in aggregate market dynamics (cf. Wiggins and Ruefli, 2005) our focus is at the firm level and on the punctuation of advantage by moves and counter moves. The temporary advantage perspective we advance in this study is reflected in the central role action aggressiveness plays in mediating between TMT integration and performance, as well as its direct relationship with performance under hypercompetitive conditions.

Action aggressiveness is essential for competing in hypercompetitive environments where temporary advantage is the norm. To further examine the idea of action aggressiveness leading to temporary advantage, we correlated the measure of action aggressiveness with both the level of financial performance and the change in such performance for a subsequent three-year period (2007 to 2009). Findings revealed no significant correlation with the level of future performance (profit margin, $r = 0.045$, $p > 0.05$, $n = 92$; ROE, $r = 0.075$, $p > 0.05$, $n = 80$) nor with the change in performance (profit margin $r = -0.074$, $p > 0.05$, $n = 92$; ROE, $r = -0.035$, $p > 0.05$, $n = 80$), thus suggesting that the advantage derived from action aggressiveness is temporary or transient.

Second, this study contributes broadly to research on hypercompetition. In addition to advancing the conceptualization and measurement of a hypercompetitive environment, we expand this research stream in several ways. We first differ from prior studies by not relying on financial performance to reveal the incidence of hypercompetition. While weak financial performance may be expected in a hypercompetitive environment, it is neither a necessary nor sufficient indicator of hypercompetition. Our study instead invokes a perceptual approach to hypercompetitive environment that is closely aligned to managerial actions. In addition, while a central line of inquiry in hypercompetition research has been the search for its pervasiveness, the present study allows its intensity to vary across firms' task environments. By adopting this relative perspective, we help discern the consequences of hypercompetition. Moreover, despite the prominence of firm actions and behaviors in D'Aveni's (1994) original work, empirical examination of managerial processes and firm actions has been constrained. Our findings on TMT dynamics and action behavior help redress this deficit.

Third, the study expands competitive dynamics research, which so far has devoted limited attention to the environmental context in which rivalry takes place and has done little to investigate in depth the internal processes and TMT dynamics that underlie competitive behavior. Our study fills the gap by examining the hypercompetitive context and the interplay among TMT members, as well as the implications of such interplay for competitive behavior and performance. It complements prior studies' exclusive reliance on archival, secondary data and responds to calls for more applications of the perceptual approach (Reger and Huff, 1993), a method that is useful for conducting research in situations where objective data are unavailable or unreliable, as in many international settings (Jayachandran *et al.*, 1999). Such an integrated approach opens up a promising avenue for exploration and reveals the intricacy of external forces and internal dynamics (Chen, 1996). This consideration, combined with the study's exploration of hypercompetitive environments across diverse industries and in an international setting, contributes to competitive dynamics research that only recently has begun to incorporate cross-border, cross-cultural concerns into its research domain (Yu and Cannella, 2007).

DOI: 10.1002/smj

Implications

Our results offer substantial support for our hypotheses and model overall. Perhaps most significantly, the findings redirect attention to the noticeable omission of executive leadership and process elements (see Eisenhardt and Brown, 1996; Hambrick *et al*., 1996 for notable exceptions) in both the hypercompetition and competitive dynamics literatures. Both literatures have devoted inadequate attention to the internal processes necessary for initiating competitive actions and presume that formulating and executing such actions is relatively straightforward. Our findings suggest otherwise. Although top team sociobehavioral integration is favorable for competitive aggressiveness, it is under conditions of hypercompetition that it becomes an even more significant factor in a firm's capability to generate competitive actions to secure temporary advantage. The evidence suggests that top team integration is vital to overcoming extensive environmental noise, volatility, and divergent perspectives among executives to make decisive moves against rivals when competitive advantage is fleeting and short lived. Those teams that establish such integration generate more actions and, through these actions, better performance.

As a decidedly U.S.-based concept, the majority of empirical investigations on hypercompetition have been conducted within a U.S. context. (The same criticism also applies to competitive dynamics research.) In many respects, this U.S. focus makes sense, as the World Economic Forum frequently places the U.S. at or near the top in its rankings of global competitiveness. Today, however, in many industries, especially global ones, competition has changed the parameters too quickly for traditional oligopolistic strategies to generate substantial rent streams, and any advantages gained must be regarded as transient (Thomas and D'Aveni, 2009). Given the rising level of economic activity taking place outside the United States and the level of global interaction and competition escalation, it is necessary and beneficial to explore the applicability and relevance of temporary advantage to economies with different cultures, histories, and business practices. The study's Taiwanese context offers an appealing and critical extension for both hypercompetition and competitive dynamics research.

This research also contributes to business practice. The study of how companies interact with rivals—especially, in the era of temporary advantage—is of vital importance, shown in a recent McKinsey survey of global executives (Coyne and Horn, 2008). Our study, focusing on action aggressiveness, shows that it is critical to prepare a company for engaging with its rivals in a hypercompetitive environment through the management of a few key executive process concerns. For instance, a company can maximize its TMT integration by recruiting executives with compatible personalities and communication skills (Lin and Shih, 2008), while executive training and team building should involve cross-functional interactions, as well as task-related and interpersonal exchanges. Our research offers an integrative perspective that highlights the central role executive leadership plays in business competition (Montgomery, 2008).

Limitations and future directions

This study takes a first step in conceptualizing and modeling a key action attribute within the broad context of organizational environment, TMT dynamics, interfirm rivalry, and firm performance. Future studies should expand the conceptualization to incorporate other attributes of competitive behavior, such as action scope (Yu and Cannella, 2007) or range (Ferrier, 2001) and response speed (Chen and Hambrick, 1995). The multidimensional extension of action/response attributes is critical for the theoretical and empirical advancement of competitive dynamics and hypercompetition research.

Second, the sample used here was drawn from Taiwan. Despite the merits of sampling from the population of Taiwanese companies, the generalizability of the findings requires that additional studies be conducted elsewhere. It can be argued, for instance, that in a *collective* society (Hofstede, 1980), in which social harmony is emphasized, it may be the norm to have high sociobehavioral integration and low competitive aggression, creating a limited range in our independent variables and making it difficult to detect significant results. If so, our sample provides a conservative platform from which to test the idea of temporary advantage and hypotheses that link hypercompetitive environments, competitive actions, and TMT dynamics. Alternatively, one

DOI: 10.1002/smj

may argue that in a collective culture, lack of sociobehavioral integration and/or being competitive may be problematic because it violates cultural norms. Thus, the damaging effects of low integration and high aggressiveness may be more extreme in this type of cultural context, and our findings are perhaps context dependent. Regardless, research should be extended to other countries with similar and/or contrasting cultural or institutional backgrounds.

Another concern is the sampling of companies from diverse industries, which could confound the findings with industry-specific effects. The research should be expanded to include industry-structure indicators. In addition, because the sample was collected from at least two senior executives in a firm, the accuracy and consistency of the research data should outweigh any possible shortcomings (Chen *et al*., 1993). Future research should explicitly take into account the broad industry and environmental context. Studies should also examine the interrelationships among key constructs using a longitudinal design.

Lastly, studies could examine further organizational concerns (such as firm culture and structure) fundamental to pursuit of temporary advantages in a hypercompetitive environment. Insights might be gained, for example, by simultaneously examining the role of TMTs and boards of directors in competitive behavior (Carpenter *et al*., 2004).

In summary, taking the perceived hypercompetitive environment to be the defining force of a firm's competitive behavior and a source of differential temporary advantage offers critical insights for a diverse range of research topics and business practices. Our study highlights essential organizational and competitive capability concerns that are vital for navigating and thriving in hypercompetitive engagements.

ACKNOWLEDGEMENTS

The authors would like to thank Jinyu He, Marta Geletkanycz, Metin Sengul, and Wei Shan for their valuable comments on an earlier draft of this article. Financial support from the Darden Foundation of the University of Virginia and the National Science Council (Taiwan) is acknowledged.

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APPENDIX
Measures and questionnaire items

Variables and items[a]	Standardized factor loadings	AVE[b]	CR[b]
Hypercompetitive environment		0.76	0.92
My company operates in an industry where...			
1. Markets and customers of various players greatly overlap.	0.92		
2. Head-to-head rivalry is common.	0.91		
3. One false step can cause a firm's downfall.	0.89		
4. Cause-and-effect relationships are often difficult to discern.	0.74		
TMT sociobehavioral integration		0.68	0.94
A. Interpersonal interaction			
Members of the top management team in my company...			
1. Enjoy cultivating personal connections with each other.	0.81		
2. Interact frequently outside the work place.	0.88		
3. Interact with each other's family in various get-together activities.	0.91		
B. Task-oriented interaction			
4. Develop a large network of colleagues and associates at work they could call on for support when necessary.	0.88		
5. Are ready to help each other complete jobs and meet deadlines.	0.80		
6. Will defend each other promptly when facing external criticism.	0.72		
7. Proactively remind executives of potential problems and assist in resolving them.	0.78		
8. Will help me to achieve my goal through their successful experiences.	0.79		
Action aggressiveness		0.84	0.97
A. Action volume			
My company initiates far more numbers of actions than direct rivals concerning...			
1. Market expansion	0.85		
2. New product introduction	0.94		
3. New service offering	0.92		
B. Action speed			
My company initiates far faster actions than direct rivals concerning...			
4. Market expansion	0.94		
5. New product introduction	0.92		
6. New service offering	0.93		

[a] Model fit indices: $\chi^2 = 183.99$, df = 127, $\chi^2/df = 1.45$; RMSEA = 0.07; SRMR = 0.06; NNFI = 0.96; CFI = 0.97.
[b] AVE = Average variance extracted, CR = Construct reliability.

DOI: 10.1002/smj