

COMPETITIVE TENSION: THE AWARENESS-MOTIVATION-CAPABILITY PERSPECTIVE

MING-JER CHEN
University of Virginia

KUO-HSIEN SU
National Taiwan University

WENPIN TSAI
The Pennsylvania State University

This paper investigates competitive tension, or the strain between a focal firm and a given rival that is likely to result in the firm taking action against the rival. Drawing on the awareness-motivation-capability perspective, we show how perceived competitive tension, as constructed from managers' and industry stakeholders' competitor assessments, is influenced by the independent and interactive effects of three factors: relative scale, rival's attack volume, and rival's capability to contest. Our results provide a new avenue for studying competitors and the relationship between competitor analysis and interfirm rivalry.

In science, there is a steady state in which opposing forces hold each other in check until the build-up of tension turns the static relationship into dynamic interplay—the point when the steel cable snaps, the steam chamber's pressure valve opens, or one psychological force overwhelms the other. In business practice, a similar phenomenon exists: when tension that one opponent imposes on another triggers rivalrous actions.

Competitor analysis is central to strategy and organization research (Hitt, Ireland, & Hoskisson, 2005; Porter, 1980). Previous research has explored a number of important issues, including conjecture variation (Amit, Domowitz, & Fershtman, 1988), competitor identification (Porac & Thomas, 1990), and blind spots (Zajac & Bazerman, 1991), and has made advances in such areas as theoretical integration of competitor analysis and interfirm rivalry (Chen, 1996). Fundamental questions—such as who a focal firm's competitors are, and how much competition the firm faces from each rival—have been implicitly or explicitly addressed by a variety

of studies (e.g., Reger & Huff, 1993; Smith, Ferrier, & Ndofor, 2001). These studies, although sharing common research threads, differ in their conceptual development and analytic focus.

Competitive dynamics research, which analyzes competition in terms of individual market actions, has examined predictors and effects of interfirm rivalry through the lens of the firm dyad (Chen & MacMillan, 1992; Ferrier, 2001). These studies have produced a diverse set of organizational and strategic variables centered on awareness, motivation, and capability—three key drivers of interfirm rivalry (Smith et al., 2001). However, researchers have relied almost exclusively on observable market factors or structural variables, ignoring the perceptual aspect of interfirm rivalry. Research taking a perceptual (or in some cases, cognitive) approach has contributed to the conceptualization (Porac, Thomas, Wilson, Paton, & Kanfer, 1995), identification (Clark & Montgomery, 1999), and categorization (Hodgkinson & Johnson, 1994) of competitors, as well as of strategic (Reger & Huff, 1993) and competitive (Porac et al., 1995) groups. Nonetheless, this research has tended to treat a firm's competitors as a homogeneous group and has demonstrated almost no effort to examine the varying degrees of “pressure” (Porter, 1980) that a firm experiences from its rivals, let alone the implications for critical aspects of interfirm rivalry, including attack (Ferrier, 2001) and retaliation (Chen & MacMillan, 1992). Most fundamentally, competitive tension and related ideas, such as intensity (Barnett, 1997), threat (Michell, 1989), and pressure

This paper benefited greatly from the insights of Amy Hillman and three anonymous reviewers. The authors would like to thank Donald Hambrick, Adelaide King, Theresa Cho, Javier Gimeno, Jerry Goodstein, Jinyu He, Samuel Kotz, John Michel, Danny Miller, Charles Tucker, Ron Wilcox, Zoë Bower, and Tieying Yu for their valuable comments on a draft of this paper. Financial support from the Darden Foundation, University of Virginia, is acknowledged. Hao-Chieh Lin and Jaeik Oh helped in data extraction and analysis.

(Sinha & Noble, 1997) have been used interchangeably in the literature without systematic conceptualizations or operationalizations. This gap is problematic because scholars use and apply these ideas widely in their research.

To address these concerns, this article formalizes the construct of competitive tension, defined as the strain between a focal firm and a given rival that is likely to result in the firm taking action against the rival. Although our conceptualization incorporates both objective and perceptual considerations, the empirical focus of our study is perceived competitive tension. Specifically, we first investigate the extent to which such firm-dyad variables as relative scale, rival's attack volume, and rival's capability to contest derived from the awareness-motivation-capability (AMC) perspective can predict perceived tension. To demonstrate the significance of the proposed construct and its behavioral implications, we then examine the effects of perceived tension on a firm's consequent competitive actions against a rival.

By introducing the notion of competitive tension, this research reconceptualizes the relationship between competitor analysis and interfirm rivalry theorized by Chen (1996). Through the empirical application of the awareness-motivation-capability perspective to this study, and by exploring the interactions among the three awareness-motivation-capability variables, we enrich, extend, and formalize this theoretical perspective. Equally important, by analyzing the objective sources of *perceived* competitive tension, this article bridges two contrasting approaches to competitor analysis and answers calls by Reger and Huff (1993) and Jayachandran, Gimeno, and Varadarajan (1999).

THEORETICAL BACKGROUND

The strategy literature has long highlighted the importance of competitor analysis. Early work drew mainly from industrial organization (IO) economics (Bain, 1956; Porter, 1980) to study competition at the industry level, relying on the assumption that firms in the same industry are *de facto* competitors. Later researchers refined the notion of competitors to take into account intraindustry heterogeneity by studying the formation of various groups in the same industry (Cool & Schendel, 1987) and analyzing competitors at the brand or product level, an effort initiated by marketing researchers (Clark & Montgomery, 1999). Scholars taking a strategic group approach have considered firms in the same "primary competitive group" (Porac, Thomas, & Baden-Fuller, 1989: 414) to be homogeneous, or they have classified them broadly as

direct (Peteraf & Bergen, 2003) or core competitors (Porac et al., 1995). The assumption underlying this approach is that firms belonging to the same strategic (or competitive) group will face comparable degrees of competition and hence compete similarly. Although IO economics and strategic group research provide an essential foundation for competitor analysis, they do not address the intricacy of differential relationships and the possible asymmetry of competitive perceptions and behaviors for each pair of firms (Chen, 1996). Accordingly, recent competitive dynamics research has proceeded by differentiating the intensity of competition a firm encounters with various rivals and offering implications for actions toward specific opponents.

Competitive Dynamics

Conceptualizing interfirm rivalry as the exchange of actions and responses, competitive dynamics researchers have found that the characteristics of an action (Ferrier, 2001) and of an attacker (Chen & MacMillan, 1992) and defender (Smith et al., 1991) are related to the likelihood and speed of a response, which in turn relate positively to performance (Young, Smith, & Grimm, 1996). There have been some important conceptual advances. To capture the relational nature of competition, researchers have carried out competitor analysis in pairs, taking the perspective of a focal firm (Chen, 1996). This dyadic approach recognizes the varying degrees of competition inherent in each relationship and constitutes a fine-grained analysis that complements the structural (Porter, 1980) or group approach (Cool & Schendel, 1987).

Research has also shown that the analysis of competitors is especially meaningful if it can be used to predict interfirm rivalry—the engagement of firms through competitive actions (Chen, 1996). This recognition is essential for differentiating competitor analysis (a static consideration of the relationship between firms) from interfirm rivalry (interplay between firms and the behavioral aspects of competition); more importantly, it is crucial for establishing a conceptual link between the two.

To this end, research has identified three underlying drivers of rival behavior: awareness of a competitive relationship and/or competitors' initiatives, motivation to act (or respond), and the capability to do so (Smith et al., 2001). Recent studies have focused, variously, on a stream of actions (Ferrier, 2001), a particular type of market action such as entry/exit (in contrast to previous investigation of all types of actions) (Baum & Korn, 1996), and interfirm rivalry in a multimarket context (Gimeno, 1999). Researchers have found,

among other results, that a simultaneous attack of multiple actions carried out over a significant duration of time may overwhelm rivals into a period of inaction (Ferrier, 2001).

Despite these advances, however, competitive dynamics research has mostly remained focused on observable market variables or structural indicators of competition. It therefore leaves unexplored some critical issues concerning the relationship between competition and the perceptions and opinions of corporate executives and industry stakeholders, including the notion, for example, that two firms facing exactly the same market conditions may evaluate competitors and interfirm relationships differently (Chen, 1996). A few scholars have begun to stress that it is necessary to complement the use of objective indicators with a perceptual evaluation of a firm's competitive environment (Ferrier, 2001; Jayachandran et al., 1999) by studying how each competitive relationship is perceived by managers (Porac et al., 1995; Reger & Huff, 1993) as well as by other key industry stakeholders, such as financial analysts (Chen, Farh, & MacMillan, 1993). However, no study thus far has systematically examined the sources, meanings, and consequences of perceptions across different competitive relationships.

Competitive Tension

Although competitive tension could conceivably occur at an industry or group level, we take the position in this article that competitive tension, in keeping with the competitive dynamics perspective, is a firm dyad-level construct. This is the level at which most competitive engagement occurs and that serves as the basis for inferring group-level phenomena (Chen, 1996). A critical but unexamined concept in competitor analysis, competitive tension provides a locus for the in-depth exploration of perceptual and objective considerations of competitors.

For several reasons, we use the term "tension" rather than "threat," "intensity," or another term.

¹ Porter (1980), for example, raised the possibility that a group of rivals may join together to reprimand a "bad" competitor.

² A few words to clarify the subtle differences among these related terms are in order. *Threat* is a specific and substantial challenge one firm presents to another; *intensity* denotes the *degree* of pressure, threat, or tension that exists between firms. Compared with threat, pressure is of less magnitude and is more general. Both threat and pressure can create and perpetuate a state of "tension" between rivals. In other words, by studying competitive tension, we essentially are evaluating the aggregate

Most importantly, tension, as it is conceptualized here, describes the state of latent strain that precipitates the "breaking point" when strain becomes manifest through competitive actions. Thus, tension defines the forces that build up and tend to pull a static interfirm relationship into dynamic behavioral interplay between rivals. It can be conceived of as a sort of energy storage agent: once there is enough build-up (perhaps as a consequence of prior battles or of managerial and industry psychology), competitive tension is likely to explode into rivalrous actions.

Tension lends itself to both objective and perceptual considerations. A term used widely in the natural and social sciences, tension has objective definitional meanings in physics, fluid mechanics, and electronics, as well as subjective or perceptual applications, in psychology and psychiatry. Physics, for example, uses the term to delineate potential versus kinetic energy. In contrast, psychology employs the term to convey feelings of fear and anticipation or to express the build-up of opposing psychological forces.

In this study, perceived competitive tension denotes the extent to which a firm's managers and industry stakeholders consider a given rival to be the focal firm's primary competitor, whereas objective structural tension relates to the ever-changing industry structure or market conditions in which rivals operate. Different manifestations of objective structural tension have been examined directly or indirectly, including market commonality (Chen, 1996), multimarket contacts (Baum & Korn, 1999), and reciprocal threat (Gimeno, 1999). Although both objective and perceptual considerations are essential, the empirical focus of this study is perceived tension.

Perceived tension is consequential because it has implications for managerial actions (Dutton & Jackson, 1987; Reger & Huff, 1993), although previous research has yet to explore the effects of such tension on interfirm rivalry. Our position is that a critical determinant of the likelihood of a firm's engaging in interfirm rivalry with a given rival is whether both informed managers of the firm and such industry stakeholders as consultants and financial analysts perceive the existence of competitive tension. Indeed, the perceptions of decision makers and industry stakeholders alike—the level of competitive apprehension or anticipation they feel as they observe, filter, and act on competitive "information"—inform the way a firm acts (strate-

threats and pressures (both objective and perceived) that a firm experiences to predict future competitive actions.

gically or competitively) on those perceptions. Because industry stakeholders' views of a firm's competitive outlook are likely to be more differentiated than those of the firm's managers (who may be influenced by, for example, managerial aspirations), their perceptions are equally critical.

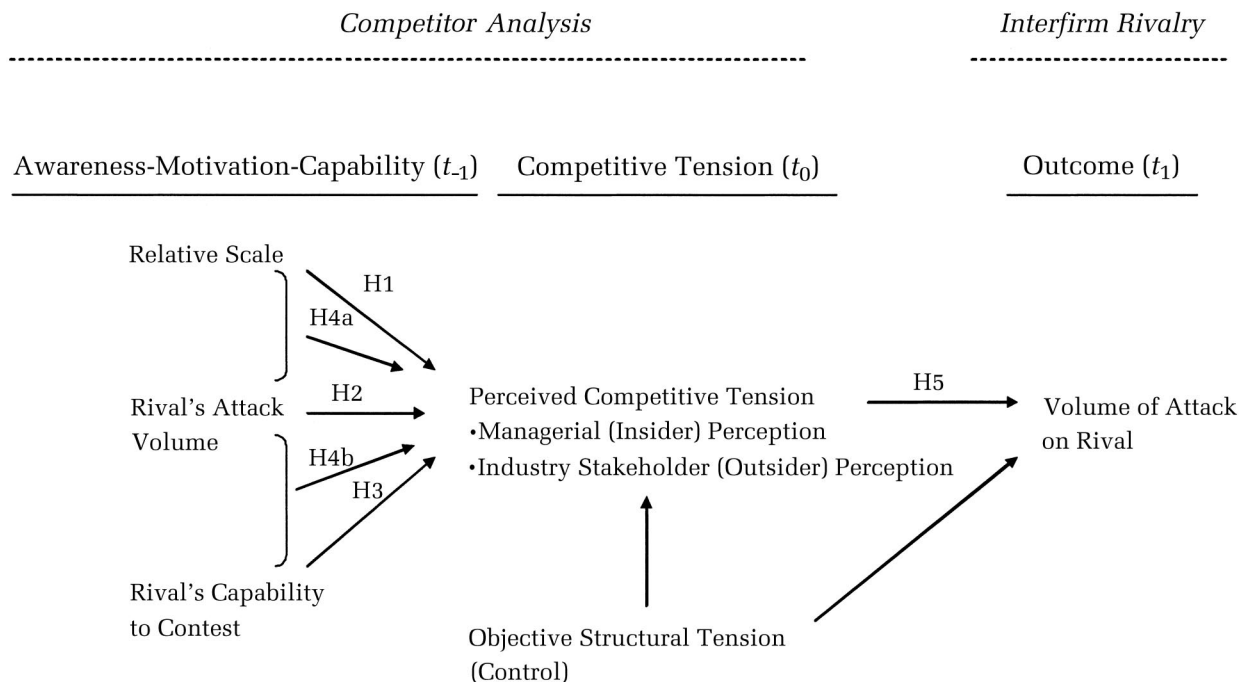
The Awareness-Motivation-Capability Perspective

Given the role of perceived tension in competitor analysis, it is essential to identify its key antecedents. According to the awareness-motivation-capability perspective, three behavioral drivers influence a firm's decision to act or respond: awareness, motivation, and capability (Chen, 1996). In competitive dynamics research (Smith et al., 2001), individual awareness-motivation-capability components are manifested in a range of variables, including action visibility and firm size (Chen & Miller, 1994) for awareness; territorial interests in different markets (Gimeno, 1999) for motivation; and execution difficulty and information processing (Smith, Grimm, Gannon, & Chen, 1991) for capability. Some other variables, such as top management team characteristics (Ferrier, 2001), correspond to more than one component. Although the awareness-motivation-capability perspective has been applied to the investigation of interfirm rivalry (Chen, 1996), it has yet to be used for the

study of prebattle competitor analysis or for our purpose: examining the perceived and objective relationship between rivals.

To extend the awareness-motivation-capability perspective to competitor analysis (and the study of competitive tension) at the firm-dyad level, we focus on a pairwise comparison between a focal firm and its rivals. We argue that each awareness-motivation-capability component at the firm-dyad level influences both managers' and industry stakeholders' perceptions of competitive tension. In the context of this research, awareness is indicated by relative scale (defined, per Baum and Korn [1999], as a competitor's operating capacity compared with that of a focal firm's), which captures visible size or scale disparities that affect managers' and industry stakeholders' cognizance of the relationship between the focal firm and a given rival. Motivation is reflected by a rival's attack volume (defined, per Ferrier [2001], as the extent to which a focal firm's markets are under attack by a given rival's actions), which highlights past competitive actions that provide the incentive for a firm's managers and industry stakeholders to consider the rival to be in direct competition with the firm. Capability is signaled by a rival's capability to contest (defined as the operational ability of a given rival to challenge a focal firm in the marketplace) and describes the rival's relative resource-deployment ability (compared with the focal firm's); this ability in turn influences

FIGURE 1
A Model of Competitive Tension



assessments of the intensity of the competitive relationship by both the firm's managers and industry stakeholders.

HYPOTHESES

This section first applies the awareness-motivation-capability perspective to an examination of how relative scale, rival's attack volume, and rival's capability to contest influence—individually and interactively—perceived competitive tension. It then investigates the impact of this construct on the ensuing rivalry between firms. Figure 1 summarizes our research model. As illustrated in the figure, competitive tension sharply articulates the conceptual link between competitor analysis and interfirm rivalry (Chen, 1996).

Awareness-Motivation-Capability Antecedents of Competitive Tension

Relative scale. Size, specifically the scale of an organization's operation, has long been considered one of the most important contingent variables affecting a firm's strategy and structure (Hambrick, MacMillan, & Day, 1982). Large scale is often associated with market power (Hambrick et al., 1982) and visibility (Smith et al., 1991). Competitive dynamics research has shown that large firms, or those with great scale or operating capacity, are more recognizable in an industry than smaller firms and that they differ from their smaller rivals on competitive behavior attributes (Chen & Hambrick, 1995). Larger-scale firms, for instance, are more likely to initiate massive attacks on their rivals and to be committed to protecting their reputations when attacked.

Indeed, according to conventional strategy wisdom, scale (or size in general) is a major source of competitive concern (Baum & Korn, 1999) and, in a competitive situation, it is often the first organizational characteristic to attract the attention of a focal firm's managers and stakeholders (Chen & Miller, 1994). As a result, relative scale is likely to associate positively with competitive tension perceived by a firm's internal and external stakeholders.

Hypothesis 1. The greater the scale of a given rival relative to a focal firm, the greater the perceived competitive tension.

Rival's attack volume. The relationship between firms in the marketplace, or market interdependence (Porter, 1980), is the most significant factor affecting conjectural variations and sphere of influence (Gimeno, 1999). Two firms are head-on

opponents and have strong incentive to act against each other if they compete directly in many markets (Baum & Korn, 1996; Gimeno, 1999); further, they engage each other with moves and counter-moves that have direct implications for their market shares and success (Chen & Miller, 1994).

Managers and industry participants would consider any such attack initiated by a rival on a firm's markets as entry into a new one or expansion in an existing one a direct challenge to the firm (Ferrier, 2001). Tapping into the motivational component of competitive tension, a rival's attack on a focal firm's markets, especially those valued by the firm, moves the firm's managers and outside stakeholders to view this rival as the one that imposes the greatest tension, forcing the firm to act (or react) by defending its turf (Chen & MacMillan, 1992). Baum and Korn's (1999) finding that rivals with high multimarket contacts are less likely to exit each other's markets provides additional evidence.

Research has identified different characteristics of attack, such as volume and duration (Ferrier, 2001); our study focuses on attack volume, as indicated by the number of actions. A firm's managers and outside stakeholders will be the most motivated—and the most sensitive to the tension created by an opponent—if the opponent has recently launched a large number of attacks on its markets. The opponent's high volume of attacks leads to strong perceived tension.

Hypothesis 2. The greater the volume of a given rival's attacks on a focal firm's markets, the greater the perceived competitive tension.

Rival's capability to contest. The extent to which a rival's operational capability potentially challenges a focal firm in the marketplace (either with an attack or by responding to the focal firm's action) is a critical factor influencing perceived tension between the two firms. Each of a focal firm's rivals is endowed with various types and amounts of resources that are vital for its operation; consequently, each is equipped with different capabilities, in the eyes of the firm's managers and industry stakeholders, in its engagements with the firm. Examples of resources that are essential for firm operation and competition include the ATM

³ The basic ideas here have their theoretical roots in the resource-based view of the firm (Barney, 1991) and the dynamic capability perspective (Teece, Pisano, & Shuen, 1997), which focus on the firm level and stress ideas such as uniqueness and heterogeneity. Competitive dynamics, the perspective in which this paper is grounded, focuses on the firm-dyad level and emphasizes ideas such as similarity (Chen, 1996) and relativity

system in the banking industry and the logistics or operating hub structure in the discount retail industry.

A rival's capability to contest derives mainly from two distinct but closely related circumstances. The first occurs when the rival and the focal firm have highly similar resource profiles—what we call the “similarity consideration.” The second occurs when the rival is a significant player in terms of the resource(s) the focal firm values most for its operation; this we call the “salience consideration.” Simply put, a firm's managers and outside stakeholders will perceive the rival with the resource profile most similar to the firm's own and/or with the highest salience regarding the resources critical to the firm's operations as posing the greatest challenge to the firm's operational capability—and therefore, as imposing the greatest competitive tension. Our inclusion of similarity and salience considerations in the conceptualization of this construct is in line with Porac and Thomas's observation: “Two organizations are similar if they share important attributes and hence tap the same resources in the task environment. Because critical resources are usually scarce, similar organizations are usually competitively interdependent” (1990: 225).

To elaborate, first, firms with similar resource profiles are likely to have comparable capabilities and competitive stances (Miller & Shamsie, 1996), and competitors with similar strategies and structures impose great pressure on each other (Heil & Robertson, 1991). Consequently, a focal firm's managers and industry stakeholders are likely to consider a rival with a similar operations resource profile to be a direct competitor. These arguments are in line with Gimeno and Woo's (1996) finding of a positive relationship between the strategic similarity of firms and the degree of their rivalry, and with Chen's (1996) prediction that the greater the resource similarity between a rival and a focal firm, the greater the likelihood that the rival will attack (or retaliate against) the firm.

Second, resources that are essential for operational and competitive success are generally limited and scarce within an industry (Barney, 1991). A rival's capability to contest a focal firm is determined by how salient the rival is in relation to resources that a focal firm values for its operation. Therefore, capability to contest is conditioned both by the strategic importance of a given resource to

the focal firm's operation and by the rival's strength in this resource. Two firms are head-on opponents and will experience, in the eyes of their internal and external stakeholders, great tension if they rely on similar resources for operation and, more fundamentally, if each is a salient player in competing for the resources that are vital to the other (Chen, 1996).

Hypothesis 3. The greater a given rival's capability to contest a focal firm, the greater the perceived competitive tension.

Interaction effects. In addition to the independent effect each awareness-motivation-capability component has on perceived competitive tension, there are likely to be interaction effects. Drawing on Vroom's (1964) expectancy-valence theory, Chen and Miller (1994) found positive interaction effects between various triggers of competitive response, which corresponded to our individual awareness-motivation-capability components, and called for thorough future investigations of such effects. To examine the interaction effects between pairs of the three awareness-motivation-capability variables, we highlight the moderating role of the motivation component of the perspective—rival's attack volume. This premise is based on the observation that motivation is a prerequisite of behavior and is a stronger and more direct predictor of competitive relationship than either capability or awareness (Chen, 1996).

Market rivalry is the most significant factor affecting conjectural variations and mutual dependence (Gimeno & Woo, 1996). In our research, capability to contest entails a rival's potential to challenge a focal firm operationally, and relative scale constitutes a static consideration of the scale or size difference between the firm and the rival. In contrast, rival's attack volume taps into the motivational component of the awareness-motivation-capability perspective directly, as managers and industry stakeholders are more likely to perceive a given rival as imposing high competitive tension if the rival has recently unleashed a large volume of attacks on the firm's markets. The effects on perceived tension of scale disparity and rival's capability to contest depend on the motivation of a focal firm's managers and industry stakeholders, as triggered by a rival's attack volume. Indeed, they are more sensitive to a rival's scale and capability when they have recently experienced the rival's attacks in large volume. Hence, rival's attack volume will strengthen the positive effect on perceived competitive tension of both relative scale and rival's capability to contest.

(Chen & Hambrick, 1995). These perspectives are not incompatible—they differ simply in their theoretical focuses and levels of analysis.

Hypothesis 4a. The relationship between relative scale and perceived competitive tension is moderated by a rival's attack volume: the greater the rival's attack volume, the stronger the positive relationship between relative scale and perceived tension.

Hypothesis 4b. The relationship between a rival's capability to contest and perceived competitive tension is moderated by the rival's attack volume: the greater the rival's attack volume, the stronger the positive relationship between the rival's capability to contest and perceived tension.

Competitive Tension and Implications for Action

Competitive action has been a vital concern in competitive dynamics research. Scholars have found that a firm tends to act aggressively toward other firms that are visibly present or that threaten its vital markets (Smith et al., 1991) and have examined the implications of multimarket rivalry for actions such as market entry (Baum & Korn, 1996) and pricing (Gimeno, 1999). Research also has shown that managers and outside stakeholders make similar competitive assessments (Chen, Farh, & MacMillan, 1993) and that such assessments can predict rival actions taken in an industry (Chen & MacMillan, 1992).

The firm-dyad, perceptual consideration of competitive tension advanced here is consequential. If both a firm's managers and industry stakeholders perceive the firm as having high tension with a rival, it is likely that the firm will attack the rival's markets to gain (or regain) its relative advantages and to reduce the tension imposed by the rival (Chen & MacMillan, 1992). Thus, perceived competitive tension can lead to ongoing competitive rivalry and should have long-term implications for industry stability (Porter, 1980).

Strong perceived tension increases the volume of a firm's attacks on a rival's markets. However, to gauge precisely the effects of perceived competitive tension on consequent competitive actions, it is important to consider (and, from an empirical viewpoint, to control for) objective structural tension, or the dynamics of market structure. Reger and Palmer noted aptly that "managers must be *mindful* to incorporate new information proactively from many sources and actively to disregard old, automatic maps in order to develop reliable maps for changing environment" (1996: 22; emphasis in the original).

Hypothesis 5. When objective structural tension is controlled for, the greater the perceived

competitive tension, the greater the volume of a focal firm's attacks on a rival's markets.

METHODS

Sample and Data Collection

Our sample included 13 major airlines competing against each other in the top 10,000 routes during the period 1989–92. The airline industry was an ideal research context because of the rich sources of public information, well-defined markets, and acknowledged intense competition among major players (Gimeno, 1999; Smith et al., 1991). We chose this period because it was characterized by the rapid entry of new airlines and by the expansion of existing airlines into new routes, followed by an industry consolidation through mergers and acquisitions (Morrison & Winston, 1995). The turbulence of the period produced large variations for our investigation of competitive tension and interfirm rivalry.

We used both archival and survey data for our research. To identify specific markets each airline served, we obtained data from the Department of Transportation's Origin-Destination (O-D) Survey of Airline Passenger Traffic. To assess the perceived competitive tension a given airline experienced from each of the other sample airlines, we used a questionnaire mailed in 1991 to informed airline executives and industry stakeholders, including 44 "insiders" (senior executives) and 72 "outsiders" (16 security analysts, 36 consultants, and 20 travel agents). These individuals had participated in a previous airline study that evaluated various competitive moves taken by airlines (Chen et al., 1993; Chen & MacMillan, 1992). The list of potential informants for the original sample was compiled from the winter 1989 edition of the *World Aviation Directory*, augmented by other sources. The inside executives were all senior vice presidents or holders of higher titles (excluding chief executive officer) of the sample airlines. The sample outsiders were selected from various sources: (1) all security analysts who followed the industry and were listed in the 1989 edition of the *Nelson Directory of Investment Research*, (2) all consultants listed in the *World Aviation Directory*, and (3) the top 65 travel agencies (in terms of sales revenues) in the United States.

The questionnaire was pretested and professionally produced and distributed, and two follow-up mailings were carried out. The response rates were 39 percent ($n = 16$, representing nine airlines) for insiders and 47 percent ($n = 34$) for outsiders. Whereas the number of insider respondents per

firm ranged from 1 to 4, the number of outsider respondents per firm ranged from 26 to 33. A comparison of respondents and nonrespondents suggested they did not differ in such observable characteristics as firm size and industry and company experience; about 70 percent of the respondents had more than 20 years of industry experience.

Dependent Variables

Perceived competitive tension. To assess perceived competitive tension, we asked our inside and outside respondents to evaluate the extent to which a given airline could be considered a focal airline's primary competitor. The informants were asked to identify and rank, from each airline's viewpoint, its top 5 rivals from a list of all 12 other competitors. In the scoring scheme, the airline rated as the top-ranked rival of a focal airline received a score of 5; the second, a score of 4, and so forth. Those not included in the ranking received a score of 0. Scores were then averaged over all responses; thus, each score reflected the degree of competitive tension a focal airline experienced from a given competitor in the eyes of managers and industry stakeholders. We distinguished between insiders (airline executives assessed their own companies) and outsiders (analysts, consultants, and travel agents) when analyzing the survey responses and constructing our perceived tension measures.

Because the perceptual measures were aggregated for each pair of firms, there was concern about the extent to which the average score for a given pair over all the raters represented a firm's perception of each of its competitors. To check for the internal consistency of the raters' evaluations, we followed Shrout's and Fleiss's (1979) procedure to examine the intraclass correlation coefficients (ICCs) for each of the 13 airlines. The average ICC(1) value of .26 indicated that the individual ratings of each airline, obtained from the vantage

point of each of its 12 sampled competitors, were reasonably consistent over all the raters (James, 1982). Further, the average ICC(2) value of .77 suggested that the group means for the competitors' ratings were stable (Bliese, 2000). Hence, aggregations for each pair of firms were supported.

Volume of a focal firm's attack. To extend the competitive dynamics research, which has broadly examined all types of market actions, we focused on in-depth investigation of one key type of action, namely, entry into a new market. The volume of a focal firm's attack on a given rival's markets was measured as the firm's number of entries, among the 10,000 sample routes, into the rival's routes from 1991 to 1992. We considered an airline an incumbent in a route if it had at least a 1 percent share in the route (Baum & Korn, 1999).

Independent Variables

Relative scale. We measured relative scale as a rival airline's scale divided by a focal airline's scale during the same period, where scale was "available seat-miles," a common measure for airline capacity (Taneja, 1985).

Rival's attack volume. The volume of a rival's attack on a focal firm's market was measured as the number of the rival's entries into the firm's routes from 1989 to 1990. As above, we considered an airline an incumbent if it had at least a 1 percent share of a route.

Rival's capability to contest. To measure a rival's capability to contest, we relied on airline fleet structure data (obtained from the 1990 Turbine Airliner Fleet Survey), given that acquisitions of various types of aircraft and development of fleet structure are vital for airline operation and competition (Taneja, 1989). We distinguished between two aspects of a rival's capability to contest and used two variables: similarity and salience.

Similarity captured the extent to which two airlines had the same profile in terms of fleet structure. To measure similarity, we first calculated the Euclidean distance, D_{ij} , between two airlines (see the formula below). A zero distance indicated that two airlines had exactly the same distribution of different types of aircraft, and a high degree of distance indicated that two airlines had very differ-

⁴ Following an established network methodology, we used a "roster" format in our questionnaire design that provided a comprehensive list of all possible actors for respondents to rank (Wasserman & Faust, 1994). An alternative is the "free recall" format in which respondents are asked to generate their own lists of actors first and then to rank those actors. Although a free recall format tends to be less intrusive, it may reflect a recency effect because respondents may not accurately recall all relevant actors and related information (please see Bernard, Kilworth, Kronenfeld, and Sailer [1984] for a detailed discussion of informant accuracy and its implications for questionnaire design).

⁵ James (1982) reported that ICC(1) values generally ranged between 0 and 0.5, with a median of .12. Our ICC(2) value is comparable with those found in some of the well-cited psychometric research, such as Kirkman, Rosen, Tesluk, and Gibson (2004) (with a range between .68 and .79). ICC(1) in their study ranged between .10 and .13.

ent fleet structures. We then reverse-coded D_{ij} to arrive at a measure of similarity:

$$D_{ij} = \sqrt{\sum_{m=1}^n [(A_{im}/A_i) - (A_{jm}/A_j)]^2},$$

where A_{im} = the total number of type m aircraft operated by airline i ,

A_i = the total number of aircraft operated by airline i overall,

A_{jm} = the total number of type m aircraft operated by airline j ,

A_j = the total number of aircraft operated by airline J overall,

and

m = a type of aircraft operated by both airline i and airline j .

Salience captured the extent to which a rival was a dominant player flying the aircraft that were vital to a focal firm's operations. It was calculated as:

$$S_{ij} = \sum_{m=1}^n [(A_{im}/A_i) \times (A_{jm}/A_m)],$$

where A_m = the total number of type m aircraft operated by all airlines,

In the calculation of the salience index, S_{ij} , the first term, A_{im}/A_i , captured the strategic importance of a given type of aircraft to focal firm i . The second term, A_{jm}/A_m , reflected the share of this type of aircraft owned by rival j . We normalized the results so that the sum of the salience indexes for all of a given firm's competitors was equal to 1.

Control Variables

We included several control variables to rule out possible alternative explanations (cf. Baum & Korn, 1996, 1999). Age, past performance, slack resources, and objective structural tension served as controls when we were predicting perceived tension (Hypotheses 1 to 4). To measure age, we counted the number of years since the year of an airline's founding; to measure past performance, we calculated an airline's "passenger load factor" (Chen & Miller, 1994) in the prior year. In addition to these firm-level characteristics, we also controlled for slack resources, given that more slack implies more potential for competitive activities (Ferrier, 2001) and may thus influence the perception of competitive tension. We used the current ratio to measure slack resources.

Objective structural tension was a critical control variable in our analysis. It captured the extent to which a rival increased its presence in a focal firm's

markets, and it was likely to influence both the perceived competitive tension and the volume of the focal firm's attack on the rival. For objective structural tension, we adapted Chen's (1996) market commonality measure and used the change scores (1989–90 and 1990–91) for the analyses reported in Table 2 and Table 3.

We also controlled for several important firm- and route-level characteristics in our analysis predicting the volume of a focal firm's attacks (Hypothesis 5). Because the conditions of routes served in the prior year is likely to affect a firm's route entry decisions, we controlled for route density (average number of incumbents) in the routes served by the focal airline in 1991. An airline's market-entry decision may also depend on the number of rivals' routes not currently served by the focal airline and route density in these routes. In addition, following Baum and Korn (1996, 1999), we included a set of firm-level characteristics, including age, past performance, slack resources, and relative scale.

Data Analyses

To model our first dependent variable, perceived tension, at the dyadic level of analysis, we used the multiple regression quadratic assignment procedure (MRQAP), a regression analysis technique specifically designed for dealing with autocorrelation in dyadic data (see Krackhardt [1988] for a detailed explanation of this technique and Tsai [2002] for a recent application of the technique to examining the pattern of competition). For interaction effects, we first mean-centered our independent variables and then created multiplicative terms between the mean-centered variables. To check the robustness of our results, we performed additional analyses using generalized least squares (GLS) random-effects regression as well as fixed-effects regression (also known as the least squares dummy variable model). The pattern of results of these additional analyses was the same as those shown in our MRQAP analysis.

Because our second dependent variable, the volume of a focal firm's attack on a given rival's markets, was a count variable, we considered two modeling strategies specially designed for count outcomes: Poisson regression and negative binomial regression. Given that the Poisson model often underestimates the amount of dispersion in the outcome variable, we adopted the negative binomial regression model to correct for the overdispersion problems. We performed a test for the null hypothesis that the overdispersion parameter (α) equaled 0 for our model (Greene, 2003; Long &

TABLE 1
Means, Standard Deviations, and Correlations^a

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11
1. Perceived competitive tension, insiders	1.24	1.65											
2. Perceived competitive tension, outsiders	1.19	1.33	.88**										
3. Attack on rival's markets	81.98	95.96	.37*	.56**									
4. Relative scale 1990	2.89	4.90	.27 [†]	.34**	-.16*								
5. Relative scale 1991	3.75	7.06	.26 [†]	.32**	-.18*	.96**							
6. Rival's attack volume	82.69	113.50	.29 [†]	.36**	.58**	-.24**	-.23**						
7. Salience	0.08	0.07	.46**	.57**	.52**	.29**	.27**	.33**					
8. Similarity	0.60	0.15	.31*	.34**	.47**	-.08	-.10	.48**	.57**				
9. Structural tension 1989-90 ^b	0.22	1.15	.18	.16	.14	.26*	.24*	-.03	.16 [†]	-.01			
10. Structural tension 1990-91	0.26	1.60	.20 [†]	.15	.27 [†]	.07	.00	.11	.10	.06	-.03		
11. Average route density of <i>j</i> 's routes not served by <i>i</i>	4.18	1.02	.11	.19	.05	.37*	.36*	-.13	.25 [†]	.04**	.03	.02	
12. Number of <i>i</i> 's routes not served by <i>i</i>	2,126.8	2,106.1	.43*	.53**	.32*	.72**	.65**	-.08	.57**	.13**	.27*	.18*	.47*

^a $n = 156$, except for volume of attack on rival (132) and perceived competitive tension, insiders (108).

^b For better display, the scale of structural tension reported here is 100 times the original.

[†] $p < .10$

* $p < .05$

** $p < .01$

Freese, 2003). The test statistics (G^2) were all very significant and provided strong evidence of overdispersion, suggesting that the negative binomial regression model was preferable to the Poisson regression model. Again following Baum and Korn (1999), we also controlled for important firm-level characteristics to overcome the problems of analyzing relational data (Lincoln, 1984). Since the error terms might be correlated across firms, we estimated all models using robust standard errors.

RESULTS

Table 1 reports means, standard deviations, and correlations for all the independent and dependent variables in this study. It should be noted that we had 13 sample airlines, which resulted in 156 (or 13×12) pairs of perceived competitive tension observations. The number of observations for insiders' perception was 108 (or 9×12) because we had data from executives of 9 airlines only, each evaluating 12 competitors. As shown in Table 1, the perceived competitive tension measure based on insiders' responses was highly correlated with the same measure based on outsiders' responses ($r = .88$, $p < .01$), providing evidence for the validity of our construct of perceived competitive tension. Also as shown in Table 1, the two aspects of rival's

capability to contest (similarity and salience) were significantly correlated, as expected.

We calculated variance inflation factors (VIFs) to determine if there was multicollinearity in our analyses. For our analysis predicting perceived tension, the VIF value ranged from 1.22 to 2.16 and averaged 1.58, suggesting no serious problem of multicollinearity. In fact, our analytic technique, semipartialing MRQAP, is robust against multicollinearity (see Dekker, Krackhardt, and Snijders [2003] for extensive simulation results showing how the semipartialing method is analytically unbiased by multicollinearity). For our analysis predicting the volume of a focal firm's attack, the VIF ranged from 1.05 to 3.93 and averaged 2.14. A close look at the VIF suggests that slightly high intercorrelations did occur but only among some of our control variables. However, the significance levels of our results remained the same whether or not we entered the correlated control variables in our analysis. Indeed, multicollinearity did not affect our model fit and hypothesis testing.

Table 2 presents the regression results showing the effects of the antecedents of perceived competitive tension. Several models were estimated, with models 1 to 3 predicting insiders' perception, models 4 to 6 predicting outsiders' perception, and models 7 to 9 predicting the combined

TABLE 2
Results of Regression Analysis of the Awareness-Motivation-Capability Variables for Perceived Competitive Tension

Variable	Insiders			Outsiders			All Combined		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Airline <i>i</i> 's age	0.003*	-0.004	-0.001	0.005*	0.003	0.007	0.005*	0.003	0.007
Airline <i>i</i> 's past performance	-1.42 ⁺	-3.44*	-3.35*	-1.34	-1.42 ⁺	-1.52	-1.33	-1.44 ⁺	-1.54
Airline <i>i</i> 's slack resources	0.38**	1.10**	1.01*	0.50**	0.96*	1.26*	0.50**	0.97*	1.27*
Airline <i>j</i> 's age	0.03*	0.01	0.01	0.03 ⁺	0.02	0.01	0.03 ⁺	0.02	0.01
Airline <i>j</i> 's past performance	1.61	2.40	3.62	0.35	0.65	0.94	0.37	0.65	0.95
Airline <i>j</i> 's slack resources	2.89*	1.30	1.61	2.62 ⁺	1.01	1.03	2.63	1.02	1.04
Structural tension 1989-90	0.45*	0.19	0.09	0.31*	0.13	0.00	0.31*	0.13	0.00
Relative scale		0.09*	0.48**		0.07**	0.28**		0.07*	0.29**
Rival's attack volume		0.00*	0.01*		0.00*	0.01**		0.00*	0.01**
Salience		4.16 ⁺	5.04*		5.81*	6.87*		5.77*	6.85*
Similarity		0.21	-0.80		-0.83	-1.59		-0.82	-1.58
Relative scale \times rival's attack			0.01*			0.00*			0.00*
Salience \times rival's attack			0.07**			0.05*			0.05*
Similarity \times rival's attack			-0.03*			-0.02 ⁺			-0.02 ⁺
Constant	-2.24	-1.22	0.02	-1.69	-0.99	-0.36	-1.72	-1.00	-0.36
<i>n</i>	108	108	108	156	156	156	156	156	156
R^2	.18	.32	.42	.28	.48	.57	.28	.48	.57

⁺ $p < .10$

* $p < .05$

** $p < .01$

perception. These models tested our Hypotheses 1 to 4.

Hypothesis 1 stated that the greater the scale of a given rival relative to a focal firm, the greater the perceived tension. As shown in Table 2, the coefficient for relative scale was positive and statistically significant for insiders' ($p < .05$), outsiders' ($p < .05$), and combined ($p < .01$) perceptions. Thus, Hypothesis 1 was confirmed. Hypothesis 2 stated that the greater the volume of a given rival's attack on a focal firm's markets, the greater the perceived tension. The coefficient for A rival's attack volume was positive and statistically significant for insiders' ($p < .05$), outsiders' ($p < .05$), and combined ($p < .05$) perceptions. Hypothesis 2, then, was clearly confirmed as well. Hypothesis 3 suggested that the greater a rival's capability to contest (salience and similarity), the greater the perceived tension. The coefficient for salience was positive and marginally significant for insiders' perception ($p < .10$), and positive and statistically significant for outsiders' ($p < .05$) and combined ($p < .05$) perceptions. However, the coefficient for similarity was not statistically significant in any of our models. Therefore, Hypothesis 3 was only supported for the salience aspect of capability to contest.

Hypothesis 4a predicted moderation by a rival's attack volume of the relationship between relative scale and perceived competitive tension. The coefficient for the interaction term between relative scale and a rival's attack was positive and statistically significant for insiders' ($p < .05$), outsiders' ($p < .05$), and combined ($p < .05$) perceptions, suggesting that the greater a rival's attack volume, the more positive the relationship between relative scale and perceived tension. Hence, Hypothesis 4a was confirmed. Hypothesis 4b predicted moderation of the relationship between a rival's capability to contest (measured using either the salience or similarity variable) and perceived competitive tension by a rival's attack volume. The coefficient for the interaction term between the salience variable and a rival's attack volume was positive and statistically significant for insiders' ($p < .01$), outsiders' ($p < .05$), and combined ($p < .05$) perceptions, suggesting that the greater the rival's attack volume, the stronger the positive relationship between salience and perceived tension. However, the coefficient for the interaction term between the similarity variable and a rival's attack volume was negative, contrary to our prediction for a positive interaction effect here. Overall, Hypothesis 4b was only supported when we used salience (as opposed to similarity) to measure a rival's capability to contest.

To show the patterns of the significant interac-

tion effects that supported our hypotheses in the above analysis, we plotted the interactions using one standard deviation above and below the mean to capture high and low rival's attack volume. Figure 2 presents these plots.

Table 3 presents the results of negative binomial regression analysis predicting the volume of a focal firm's attack on a rival. We estimated several models to test our Hypothesis 5. Model 1 was the baseline model, with only the control variables. Model 2 estimated the effect of insiders' perception of competitive tension. Model 3 estimated the effect of outsiders' perception of competitive tension. Model 4 combined insiders' and outsiders' perceptions into one measure and estimated the effect of this combined measure.

Hypothesis 5 stated that when the effect of objective structural tension was controlled, the volume of a focal firm's attack on a rival's markets would increase. As shown in Table 3, the perceptions of insiders ($p < .05$), outsiders ($p < .01$), and the combined group ($p < .01$) were all statistically significant, supporting Hypothesis 5. Such support was found with the control of objective structural tension, which also yielded its own independent positive effect on the firm's attack volume ($p < .05$).

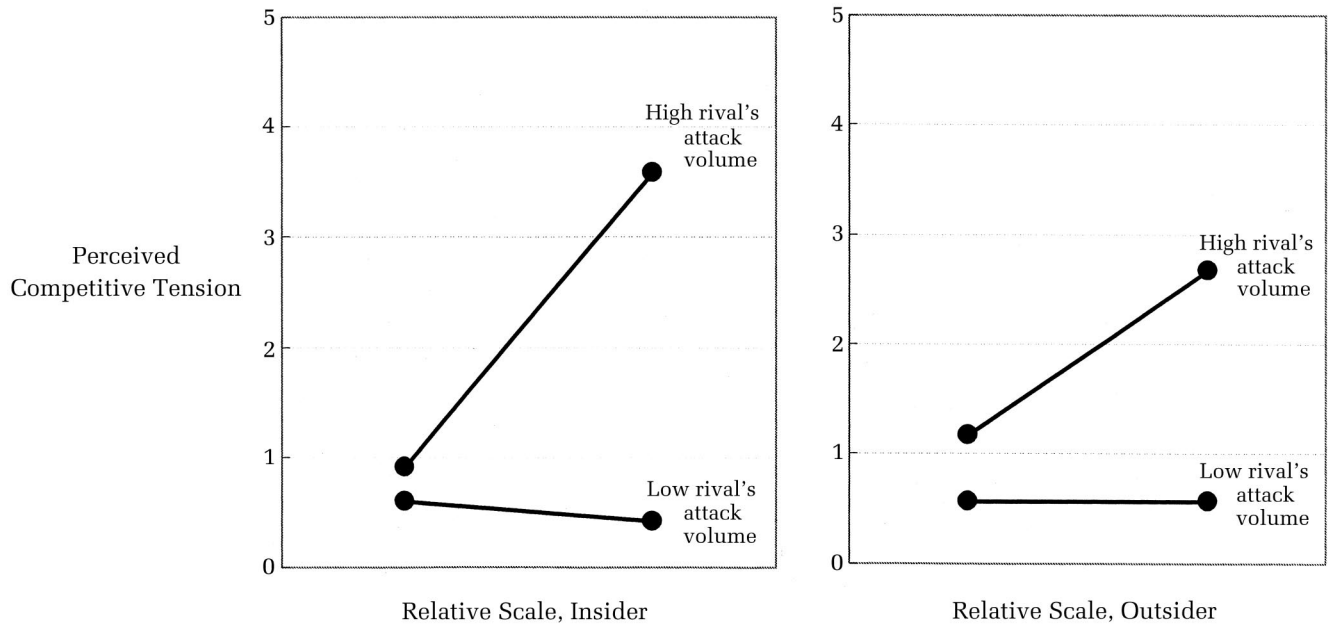
DISCUSSION

Anchored in the competitive dynamics perspective, our research conceptualizes competitive tension, a construct intended to close a significant gap in the strategy and competitor analysis literature (Hitt et al., 2005; Hodgkinson & Sparrow, 2002). The firm-dyad conceptualization of competitive tension contrasts with the prevailing consideration of direct (Peteraf & Bergen, 2003) and core (Porac et al., 1995) competitors as mostly homogeneous. It provides a refined framework of competitor analysis by differentiating the varying degrees of tension each of a firm's rivals imposes on the firm. The significance of the proposed construct is clearly shown by its behavioral outcomes: perceived tension, even when objective structural tension was controlled, was found to affect a firm's consequent actions against a given rival.

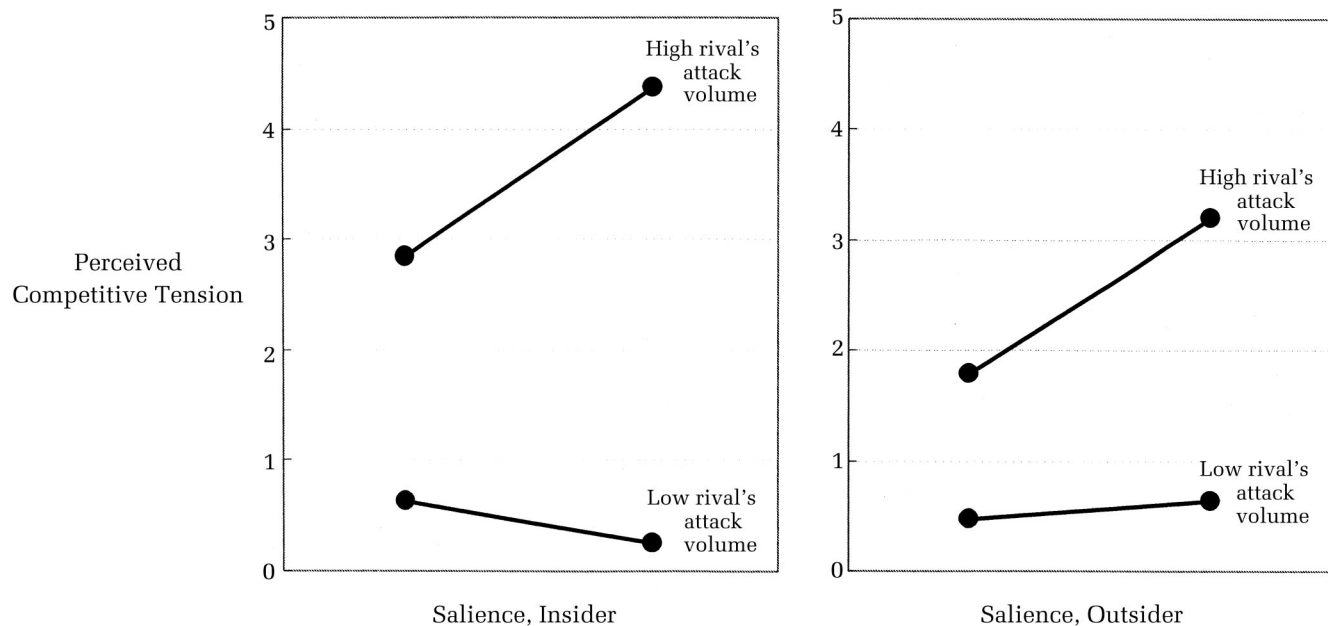
The promise of the awareness-motivation-capability perspective lies in its integrative consideration of the three antecedents and the demonstration of their influence on perceived competitive tension. The awareness-motivation-capability perspective is a natural outgrowth of findings in competitive dynamics research, and each of its components has been shown to be empirically significant in explaining the behavioral exchange of competitive moves (Chen, 1996). This study extended this

FIGURE 2
Interaction Results

(2a) Interaction between Relative Scale and Rival's Attack Volume



(2b) Interaction between Salience and Rival's Attack Volume



theoretical perspective and tested it empirically in the context of competitor analysis. The focus on competitor analysis, and particularly on insiders' and outsiders' perceptions of competitive tension, is in direct contrast with previous applications of this perspective to the study of rivalrous behavior in the marketplace. In addition to examining empirically the independent effects of each of the

awareness-motivation-capability components on perceived tension, we took an important first step in investigating the interplay among them. The research advances this promising theoretical perspective by demonstrating empirically the significance of the multiplicative relationships among the three components, as well as the central role of motivation in moderating the two other compo-

TABLE 3
Results of Regression Analysis: Effect of Perceived Competitive Tension on Attack Volume

Variable	Model 1	Model 2	Model 3	Model 4
Airline <i>i</i> 's age	0.03	0.03	0.02	0.02
Airline <i>i</i> 's past performance	−23.45	−16.65	−14.44	−14.57
Airline <i>i</i> 's slack resources	1.07	1.36	1.22	1.22
Airline <i>i</i> 's average route density	2.24**	2.25**	2.21**	2.02**
Airline <i>j</i> 's age	−0.01 [†]	−0.02**	−0.02**	−0.02**
Airline <i>j</i> 's past performance	14.47*	17.73**	15.74**	15.71**
Airline <i>j</i> 's slack resources	1.57**	0.90*	0.48	0.47
Average route density of <i>j</i> 's routes not served by <i>i</i>	0.65 [†]	0.64	0.58 [†]	0.58 [†]
Number of <i>j</i> 's routes not served by <i>i</i>	0.00**	0.00 [†]	0.00*	0.00*
Structural tension 1990–91	0.14*	0.15*	0.14*	0.14*
Relative scale	−0.09	−0.07	−0.09	−0.09
Perceived competitive tension				
Insiders		0.30*		
Outsiders			0.49**	
All combined				0.49**
Constant	−7.51	−12.90	−11.15	−11.12
<i>n</i> ^a	132	108	132	132
Log-likelihood	−594.03	−464.54	−582.37	−582.42
Likelihood ratio test	121.85**	110.31**	145.16**	145.06**

^a The sample size was reduced from 156 (for analysis shown in Table 2) to 132 by the loss of 24 observations associated with Pan Am and Midway Airlines, which declared bankruptcy in 1991.

[†] $p < .10$

* $p < .05$

** $p < .01$

nents' effects on perceived tension. The perspective not only has the potential to advance competitor analysis and interfirm rivalry research but may also illuminate understanding of interfirm actions (competitive or cooperative) and relationships in general. Further, it may create an important bridge between micro and macro organizational research, an achievement attempted earlier by Dutton and Jackson (1987) and Chen and Miller (1994).

Finally, by treating competitive tension as a perceptual phenomenon anteceded by objective awareness-motivation-capability factors, this study bridges competitive dynamics and the perceptual group approach to competitor mapping research (Porac & Thomas, 1990; Reger & Huff, 1993). Our findings suggest that in the absence of a perceptual assessment of competitors, three theoretically derived objective indicators can be used for analysis. Moreover, this article shows the relevance and significance of industry stakeholders' perceptions in the study of competitive tension. This finding, along with the high correspondence between insiders' and outsiders' ratings, supports the promise of a "social construction view" of competition (White, 1980; Zuckerman, 1999, 2000).

Overall, the current research brings to the combined study of competitor analysis and interfirm rivalry a theoretical and empirical fusion of the

awareness-motivation-capability perspective and objective and perceptual considerations of a critical new construct: competitive tension. As such, it offers evidence that objective awareness-motivation-capability indicators can predict perceived tension between rivals, a phenomenon that in turn influences future observable market behaviors.

Implications

The implications of this research are manifold. First, the firm-dyad conceptualization, in contrast to previous industry- or group-level considerations, is critical because significant differences exist even among direct rivals. Each firm experiences a different degree of tension with each rival, and from the firm's point of view each rival is unique. Our findings show that high perceived tension between a focal firm and a rival plants the seed for the firm's encroachment into the rival's markets. The issues may help advance research on strategic groups (Reger & Huff, 1993), multipoint competition (Baum & Korn, 1996; Gimeno, 1999), competitive aggressiveness (Ferrier, 2001), and interorganizational relationships (Oliver, 1990). Among the awareness-motivation-capability components, a rival's capability to contest offers particular promise. The conceptualization of this construct to include both

similarity and salience points to the underexplored research domain that spans the resource-based view of the firm (Barney, 1991), dynamic capabilities (Teece et al., 1997), and product-market competition (Porter, 1980). Although we did not find support for our hypothesis concerning a positive interaction between similarity and rival's attack volume, the negative interaction we did find suggests that "mutual forbearance" (Gimeno, 1999) may be an important idea to consider when forming a perception of competitive tension. Future research may further investigate this issue.

Second, the perceptual construction of competitive tension and the treatment of the three awareness-motivation-capability predictors as objective phenomena point to a basic concern in strategy research: the extent to which these contrasting perspectives may correspond. Indeed, the two perspectives have been used to examine such key strategy constructs as environment (Boyd, Dess, & Rasheed, 1993), strategic group (Reger & Huff, 1993), and market structure (Baum & Korn, 1996). This study provides empirical evidence of their correspondence in competitor analysis while extending recent efforts in cognitive classification (Reger & Palmer, 1996) and competitive dynamics (Ferrier, 2001; Jayachandran et al., 1999).

Third, the sensitivity of insider perceptual information has made it difficult for researchers to determine how strategists prioritize their rivals and gauge the tension each imposes. Our findings suggest that, absent perceptual competitor information provided by airline managers, outsiders' perceptions reliably indicate how a firm differentiates among a set of direct rivals. To go a step further, we would assert that whereas insiders' perceptions capture a focal firm's managerial aspirations, outsiders' perceptions reflect influential industry stakeholders' views of the firm's competitive (Chen et al., 1993) and strategic (Zuckerman, 1999, 2000) reality. How these two perceptions converge or diverge in different settings may provoke a debate on the relative importance of managers and external stakeholders in perceptual construction. Our findings echo some anecdotal evidence on the importance of stakeholders' perceptions for competitive actions in some mature industries (Chen & MacMillan, 1992); however, we interpret our findings on insiders' perceptions with caution, given that a relatively small number of insiders responded to our survey. Moreover, the research raises some unexplored, provocative questions in competitor analysis: for example, might perceived competitive tension be considered a collectively negotiated reality involving both managerial and market expectations and, if so, to what extent can such a reality explain

market outcomes (Zuckerman, 1999, 2000) and patterns of rivalry among firms (Porac et al., 1995)?

Though the empirical focus of this paper is perceived tension, our conceptualization of competitive tension includes objective structural tension. The use of objective structural tension as a control variable in the analyses and the finding of its independent impact on consequent competitive actions support previous research, which has shown, directly or indirectly, its empirical significance (Baum & Korn, 1999; Gimeno, 1999). It should be noted, however, that our conceptualization of objective structural tension includes the dynamics in market structure—specifically, the change in market commonality (Chen, 1996) between a rival and a focal firm—in contrast to previous conceptualizations of objective structural tension as a static structural variable. Both the static and dynamic aspects of market structure are important in the conceptualization of objective structural tension.

The current study has practical implications as well. First, the awareness-motivation-capability perspective is intuitively appealing and easily understood by strategists, who can rely on objective indicators to assess the level of competitive tension imposed by each rival and allocate firm resources accordingly. For instance, managers can prioritize their attention and intelligence-gathering efforts according to the level of perceived competitive tension. Also, competitive tension, which has been shown to affect future competitive behaviors, may have implications for organizational performance, and research along this line will help advance the promise of this construct.

Limitations and Future Directions

This research takes a significant first step toward the perceptual differentiation of competitors, but it may be limited by its focus on existing industry rivals. Future research should consider potential or "unseen" rivals and those outside of an industry (Porter, 1980)—the "peripheral competitors" (Porac et al., 1995). Competition occurs at multiple levels. This study focused only on competitive tension experienced at the firm-dyad level, but future research examining tension at the industry or group level could help to develop a comprehensive understanding of this important construct. In addition, to demonstrate further the significance of perceived tension for consequent interfirm rivalry, it will be necessary to broaden the research focus to other types of competitive actions besides market entry.

Because information is relatively public in the airline industry, the correspondence between per-

ceptions and objective reality, as well as between insiders' and outsiders' opinions, tends to be high—which may not be the case in other industries—and some of our measures could be improved. The use of a ranking scheme to measure perceived competitive tension, though useful for offering respondents a clear frame within which to compare and prioritize a focal firm's competitors, does not represent the exact distance between the focal firm and each competitor. Similarly, this study asked respondents to rank a firm's top five competitors. The selection of the number of competitors may be consequential and deserves further consideration; it is likely that the greater the number of competitors to be ranked, the smaller the chance for agreement among survey respondents. Also, the use of fleet structure to measure a rival's capability to contest, while appropriate in the airline context, may not get to the heart of the "sticky" or process aspects of firm resources and capabilities (Barney, 1991), an area awaiting further investigation. Researchers should explore the nuance and complexity of the interrelationships among awareness-motivation-capability variables in a longitudinal design and under various industry conditions and extend this promising perspective to develop a predictive theory not only of competitive action but also of organizational action in general.

Finally, one of the implicit premises of this research is that the competitive relationship between a pair of firms can be asymmetric: the tension that a rival imposes on a focal firm may not be equal to the tension the firm imposes on the rival (cf. Chen, 1996). In the future, it would be useful to examine perceptual asymmetry between firms.

In conclusion, this article examines an important missing element in competitor research: the idea of competitive tension. Understanding how firm managers and outside stakeholders perceive competitive tension, from the angles of scale or capacity, market action, and resource profile, can help reveal their awareness, motivation, and capability for interfirm rivalry.

REFERENCES

- Amit, R., Domowitz, I., & Fershtman, C. 1988. Thinking one step ahead: The use of conjectures in competitive analysis. *Strategic Management Journal*, 9: 431–442.
- Bain, J. 1956. *Barriers to new competition*. Cambridge, MA: Harvard University Press.
- Barnett, W. P. 1997. The dynamics of competitive intensity. *Administrative Science Quarterly*, 42: 128–160.
- Barney, J. B. 1991. Firm resources and sustained competitive advantage. *Journal of Management*, 17: 99–120.
- Baum, J. A., & Korn, H. J. 1996. Competitive dynamics of interfirm rivalry: Linking structural conditions of competition to patterns of market entry and exit. *Academy of Management Journal*, 39: 255–291.
- Baum, J. A., & Korn, H. J. 1999. Dynamics of dyadic competitive interaction. *Strategic Management Journal*, 20: 251–278.
- Bernard, H. R., Killworth, P., Kronenfeld, D., & Sailer, L. 1984. The problem of informant accuracy: The validity of retrospective data. In B. J. Siegel (Ed.), *Annual review of anthropology*, vol. 13: 495–517. Palo Alto, CA: Annual Reviews.
- Bliese, P. D. 2000. Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K. J. Klein & S. W. Kozlowski (Eds.), *Multilevel theory, research and methods in organizations*: 349–381. San Francisco: Jossey-Bass.
- Boyd, B. K., Dess, G. G., & Rasheed, A. M. A. 1993. Divergence between archival and perceptual measures of the environment: Causes and consequences. *Academy of Management Review*, 18: 204–226.
- Chen, M.-J. 1996. Competitor analysis and inter-firm rivalry: Towards a theoretical integration. *Academy of Management Review*, 21: 100–134.
- Chen M.-J., Farh, J. L., & MacMillan, I. C. 1993. An exploration of the expertness of outside informants. *Academy of Management Journal*, 36: 1614–1632.
- Chen, M.-J., & Hambrick, D. C. 1995. Speed stealth and selective attack: How small firms differ from large firms in competitive behavior. *Academy of Management Journal*, 38: 453–482.
- Chen, M.-J., & MacMillan, I. C. 1992. Nonresponse and delayed response to competitive moves: The roles of competitor dependence and action irreversibility. *Academy of Management Journal*, 35: 539–570.
- Chen, M.-J., & Miller, D. 1994. Competitive attack, retaliation and performance: An expectancy-valence framework. *Strategic Management Journal*, 15: 85–102.
- Clark, B. H., & Montgomery, D. B. 1999. Managerial identification of competitors. *Journal of Marketing*, 63(3): 67–83.
- Cool, K., & Schendel, D. 1987. Strategic group formation and performance: The case of the U.S. pharmaceutical industry, 1963–1982. *Management Science*, 33: 1102–1124.
- Dekker, D., Krackhardt, D., & Snijders, T. A. B. 2003. *Multicollinearity robust QAP for multiple regression*. Paper presented at the NAACSOS conference, Omni William Penn, Pittsburgh.
- Dutton, J. E., & Jackson, S. B. 1987. Categorizing strategic issues: Links to organizational action. *Academy of Management Review*, 12: 76–90.

- Ferrier, W. J. 2001. Navigating the competitive landscape: The drivers and consequences of competitive aggressiveness. *Academy of Management Journal*, 44: 858–877.
- Gimeno, J. 1999. Reciprocal threats in multimarket rivalry: Staking out “spheres of influence” in the U.S. airlines industry. *Strategic Management Journal*, 20: 101–128.
- Gimeno J., & Woo, C. Y. 1996. *Do similar firms really compete less? Strategic distance and multimarket contact as predictors of rivalry among heterogeneous firms*. Working paper, Texas A&M University, College Station.
- Green, W. H. 2003. *Econometric analysis*. New York: MacMillan.
- Hambrick, D. C., MacMillan, I. C., & Day, D. L. 1982. Strategic attributes and performance in the BCG matrix—A PIMS-based analysis of industrial product business. *Academy of Management Journal*, 25: 510–531.
- Heil, O., & Robertson, T. S. 1991. Toward a theory of competitive market signaling: A research agenda. *Strategic Management Journal*, 12: 403–418.
- Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. 2005. *Strategic management: Globalization and competitiveness*. Mason, OH: Thomson South-Western.
- Hodgkinson, G. P., & Johnson, G. 1994. Exploring the mental models of competitive strategies: The case for a processual approach. *Journal of Management Studies*, 31: 525–551.
- Hodgkinson, G. P., & Sparrow, P. 2002. *The competent organization*. Buckingham, U.K.: Open University Press.
- James, L. R. 1982. Aggregation bias in estimating perceptual agreement. *Journal of Applied Psychology*, 67: 219–229.
- Jayachandran, S., Gimeno, J., & Varadarajan, P. R. 1999. Theory of multimarket competition: A synthesis and implications for marketing strategy. *Journal of Marketing*, 63(3): 49–66.
- Kirkman, B. L., Rosen, B., Tesluk, P. E., & Gibson, C. A. 2004. The impact of team empowerment on virtual team performance: The moderating role of face-to-face interaction. *Academy of Management Journal*, 47: 175–192.
- Krackhardt, D. 1988. Predicting with networks: Nonparametric multiple regression analysis of dyadic data. *Social Networks*, 10: 359–381.
- Lincoln, J. R. 1984. Analyzing relations in dyads. *Sociological Methods and Research*, 13: 45–76.
- Long, S. J., & Freese, J. 2003. *Regression models for categorical dependent variables using Stata*. College Station, TX: Stata Press.
- Michell, W. 1989. Whether and when? Probability and timing of incumbents’ entry into emerging industrial subfields. *Administrative Science Quarterly*, 34: 208–230.
- Miller, D., & Shamsie, J. 1996. The resource-based view of the firm in two environments: The Hollywood film studios from 1936 to 1965. *Academy of Management Journal*, 39: 519–543.
- Morrison, S., & Winston, C. 1995. *The evolution of the US airline industry*. Washington, DC: Brookings Institution.
- Oliver, C. 1990. Determinants of interorganizational relationship: Integration and future directions. *Academy of Management Review*, 15: 241–265.
- Peteraf, M. A., & Bergen, M. A. 2003. Scanning competitive landscapes: A market-based and resource-based framework. *Strategic Management Journal*, 24: 1027.
- Porac, J. F., & Thomas, H. 1990. Taxonomic mental models in competitor definition. *Academy of Management Review*, 15: 224–240.
- Porac, J. F., Thomas, H., & Baden-Fuller, C. 1989. Competitive groups as cognitive communities: The case of Scottish knitwear manufacturers. *Journal of Management Studies*, 26: 397–416.
- Porac, J. F., Thomas, H., Wilson, F., Paton, D., & Kanfer, A. 1995. Rivalry and the industry model of Scottish knitwear producers. *Administrative Science Quarterly*, 40: 203–227.
- Porter, M. E. 1980. *Competitive strategy: Techniques for analyzing industries and competitors*. New York: Free Press.
- Reger, R. K., & Huff, A. S. 1993. Strategic groups: A cognitive perspective. *Strategic Management Journal*, 14: 103–124.
- Reger, R. K., & Palmer, T. B. 1996. Managerial categorization of competitors: Using old maps to navigate new environments. *Organization Science*, 7: 22–39.
- Shrout, P. E., & Fleiss, J. L. 1979. Intraclass correlations: Use in assessing rater reliability. *Psychological Bulletin*, 86: 420–428.
- Sinha, R., & Noble, C. H. 1997. The performance consequences of subfield entry. *Strategic Management Journal*, 18: 465–481.
- Smith, K. G., Ferrier, W., & Ndofor, H. 2001. Competitive dynamics research: Critique and future directions. In M. Hitt, R. Freeman, & J. Harrison (Eds.), *Handbook of strategic management*: 315–361. London: Blackwell.
- Smith, K. G., Grimm, C. M., Gannon, M. J., & Chen, M.-J. 1991. Organizational information processing, competitive responses, and performance in the U.S. domestic airline industry. *Academy of Management Journal*, 34: 1–26.
- Taneja, N. K. 1989. *Introduction to civil aviation*. Lexington, MA: Lexington Books.
- Teece, D. J., Pisano, G., & Shuen, A. 1997. Dynamic capabilities and strategic management. *Strategic Management Journal*, 18: 509–533.

- Tsai, W. 2002. Social structure of "coopetition" within a multiunit organization: Coordination, competition, and intraorganizational knowledge sharing. *Organization Science*, 13: 179–190.
- Vroom, V. H. 1964. *Work and motivation*. New York: Wiley.
- Wasserman, S., & Faust, K. 1994. *Social network analysis: Methods and application*. New York: Cambridge University Press.
- White, H. C. 1981. Where do markets come from? *American Journal of Sociology*, 87: 517–547.
- Young, G., Smith, K. G., & Grimm, C. M. 1996. "Austrian" and industrial organization perspectives on firm-level competitive activity and performance, *Organization Science*, 7: 243–254.
- Zajac, E. J., & Bazerman, M. H. 1991. Blind spots in industry and competitor analysis: Implications of interfirm (mis)perception to strategic decisions. *Academy of Management Review*, 16: 37–46.
- Zuckerman, E. W. 1999. The categorical imperative: Securities analysts and the illegitimacy discount. *American Journal of Sociology*, 104: 1398–1438.
- Zuckerman, E. W. 2000. Focusing the corporate product:

Securities analysts and de-diversification. *Administrative Science Quarterly*, 45: 591–619.



Ming-Jer Chen is the Leslie E. Grayson Professor of Business Administration at the Darden Graduate School of Business, University of Virginia. He holds a Ph.D. from the University of Maryland at College Park. His research interests include organizational strategy, competitive dynamics, and competitor analysis.

Kuo-hsien Su is an associate professor of sociology at National Taiwan University. He received his Ph.D. from Columbia University. His current research investigates how organizational and occupational structures influence career attainment in East Asia.

Wenpin Tsai is an associate professor of management at the Pennsylvania State University. He received his Ph.D. in strategic and international management at the London Business School. His current research interests include social capital, knowledge transfer, network evolution, and cooperative and competitive interactions inside and across organizations.



Copyright of *Academy of Management Journal* is the property of Academy of Management and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.