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ACTION CHARACTERISTICS AS PREDICTORS OF COMPETITIVE RESPONSES*

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A central question in competitive dynamics is whether a competitive response can be predicted. This study links various characteristics of actions with the total number and the time lag of competitors' responses. The hypothesized relationships were tested with a sample of competitive moves among U.S. airlines. The results suggested that responses are influenced by the characteristics of the actions that evoked them. Specifically, the total number of competitors affected by an action and the importance to these competitors of the markets under attack by the action **increase** the number of competitive responses. Strategic, as opposed to tactical, actions or actions which require substantial implementation efforts **reduce** the number and **delay** the timing of rivals' counteractions. Finally, contrary to prediction, competitors who have a high stake in the markets under attack by a competitive move react **slowly**.

(COMPETITIVE INTERACTION; RIVALRY; COMPETITIVE ADVANTAGE; COMPETITIVE ACTIONS/RESPONSES; AIRLINE COMPETITION)

Firms constantly undertake offensive and defensive actions in pursuit of competitive advantage. It is widely recognized that a basic knowledge of competitive rivalry is of paramount importance to strategic management (Porter 1980, 1985; MacMillan, McCaffery and Van Wijk 1985; Bettis and Weeks 1987; Chen 1988; Smith, Grimm, Chen, and Gannon 1989; Smith, Grimm, Gannon, and Chen 1991). Unfortunately, except for a very few preliminary investigations using small samples and retrospective reporting by single informants (MacMillan et al. 1985; Smith et al. 1989), almost no attempt has been made to examine directly the actual interactive competitive behavior in which firms engage.

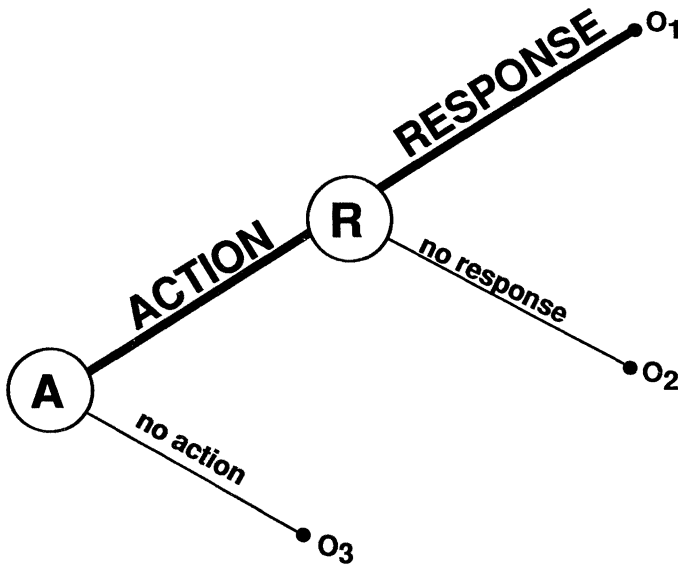
By focusing on competitive actions which provoked counteractions, this research represents a first attempt to study competitive interaction using a large sample of competitive moves drawn from real-world competition. The purposes of this paper are threefold: (1) To highlight the significance of responses in competitive dynamics while proposing two important response attributes—number of competitive responses and response lag; (2) To investigate the competitive implications of various attributes of action; and most importantly, (3) To demonstrate empirically that competitive responses may be predicted based on the characteristics of the initial actions.

Theoretical Framework

Actions and Responses

This study responds to Caves' appeal for research focusing on "rivalrous moves among incumbent producers" (Caves 1984, p. 127). Following Porter (1980), rivalry is defined here as the **exchange** of competitive moves between firms in a market. Strategic management research suggests that the way a firm acts and responds in a market determines its ultimate organizational performance (Porter 1980). While recognizing that not all actions will provoke responses, this study was concerned with how competitors actually

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O_i : outcomes, $i = 1, 2, 3$

FIGURE 1. A Framework of Competitive Action and Response.

interact in the marketplace via the ongoing **exchange of competitive moves**. Specifically the research was interested in **predicting** competitive responses. These ideas are suggested by the simple extensive game form in Figure 1.

As the game tree in Figure 1 illustrates, when a firm (A) initiates an action, its competitor (R) may have two options in reacting: it can decide either to respond or not to respond. The empirical focus of this paper was on those competitive actions which provoked responses.¹ This emphasis is indicated by the dark line running from **action** through **response** in the figure.

Specifically, an action is defined in this study as a specific and detectable competitive move, such as a new product introduction, initiated by a firm to improve or defend its relative competitive position. Similarly, a response is an **observed and discerned** counteraction taken by a competing firm to defend or improve its relative position (Porter 1980).²

¹ Recent game theory models have focused attention on the importance of bluffing in competitive rivalry, whereby a firm may threaten to engage in an all-out price war in the face of new entry (Salop 1979; Eaton and Lipsey 1981). In addition, firms may also exchange “cheaptalk,” the nonbinding preplay announcement of intended strategies, with each other (Farrell 1987). Certainly all these situations would extend the set of options available to competing firms. Following Caves (1984), nonetheless, this study focuses only on those “rivalrous moves among incumbent producers that involve resource commitments that are irrevocable for a non trivial period of time” (p. 127).

² This definition of action and response is critical in delineating the scope of this research. Clearly, there are situations in which responses may be unobserved or undiscerned by outsiders. However, the empirical focus of this study was on those actions which provoked—at least from a research viewpoint—**observed** responses. Actions which were not responded to (for whatever reasons) or whose reactions were unobserved or undiscerned from a research point of view were thus all beyond the scope of this research.

Schumpeter (1934, 1950) specifically addressed the relationship between actions and responses. He viewed the market as the arena through which competitors experiment by taking specific moves, termed innovations. Firms which successfully carry out these moves seize opportunities and reap benefits from the monopolistic position they gain from the imitator's lag in responding (Nelson and Winter 1982). However, any action which generates above normal returns will generally attract and motivate competitors to respond at a certain point (Schumpeter 1934, 1950). Naturally, not all actions will lead to successful outcomes; rather, the argument is that when a firm undertakes an action, it should be prepared to meet potential counteraction.

The basic premise of this study is that actions are not all alike and that characteristics of actions can themselves be important predictors of responses. Specifically, the research was directed to answer the following question: For those actions which provoke competitive retaliation, can the number of responses and the response lag be predicted based on the attributes of these initial actions? The relationships between characteristics of action and response comprise the focal point of empirical examination.

Characteristics of Actions

The selection of independent variables in this study draws heavily on Schelling's (1960) seminal work on decision making in conflict situations. Schelling argues that the motivation for making competitive moves in situations where competitors can make damaging countermoves is driven by the temptation of the higher payoffs to be gained by acting outside the status quo. According to Schelling, the success of a move often depends on the initiator's apparent commitment to it and on the opponent's likelihood of retaliation. If the initiator can convince the opponent that it intends to stick to its new position, it may discourage a punitive response. At the same time, competitors' incentive to respond is driven by their expected payoffs and the extent of threat the move poses in their key markets.

This study explored these concepts of commitment and expected payoffs by focusing on four characteristics of the initial action: **competitive impact** (the pervasiveness of an action's effect on competitors), **attack intensity** (the extent to which an action affects a given competitor's key markets), **implementation requirement** (the degree of effort an initiating firm requires to execute an action), and **type of action** (strategic vs. tactical). (These concepts will be fully developed in the hypotheses section.) The expected payoff for the responder may be influenced by the competitive impact and the attack intensity of the action, since the greater the competitive impact and attack intensity of the action, the greater its potential effect on the responders' profits. Implementation requirement and type of action can be seen as indicators of an initiator's commitment. In particular, strategic actions or actions with significant implementation requirements indicate strong commitment on the part of the initiator.

These proposed variables have support in the literature. Competitive impact and attack intensity can be directly traced to comparable attributes in MacMillan et al. (1985), while type of action and implementation requirement capture, to a certain extent, the MacMillan et al. concept of complexity and the Smith et al. (1989) notion of radicality.

Characteristics of Responses

Key characteristics of response should be selected by considering how a potential response can influence the efficacy of a given action in creating and sustaining competitive advantage. From an initiator's point of view, a competitive advantage may be more sustainable if an action it initiates can (1) minimize the total number of competitive responses, and (2) delay the responses (Porter 1980; MacMillan et al. 1985; Smith et al. 1989).

Number of Responses. The consequences of a competitive action for an actor depend at least partially on the number of competitive responses that action provokes. The initiating firm's profit may be adversely affected if its action triggers intense counteractions from a large number of competitors. As noted by Mansfield (1968) and Nelson and Winter (1982), an initiator's competitive advantage tends to decrease over time as more competitors enter the fray. On the other hand, as long as the number of competitive responses to an action remains relatively small, the initiating firm will continue to enjoy its monopolistic (or quasi-monopolistic) status (Mansfield 1968; Porter 1980; MacMillan et al. 1985).

Response Lag. Response lag is important in that it represents a period during which an initiator monopolizes the market and reaps the economic benefits of an action, provided the action is effective (Porter 1980; Ansoff 1984; MacMillan et al. 1985; Chen 1988; Smith et al. 1989). Accordingly, an initiator prefers to undertake actions that maximize response lag. As Porter points out (1980, p. 98): "Finding strategic moves that will benefit from a lag in retaliation, or making moves so as to maximize the lag, are key principles of competitive interaction." Empirically, a negative relationship was found between a firm's organizational performance and the length of time taken by a firm to react to a competitor's market move or to adopt a new technology (Mansfield 1968; Smith et al. 1989). These studies suggest that competitors' responses should have significant implications to the relative competitive advantage pursued by both initiators and responders. As Figure 1 implies, the outcomes (O_i), or the combined payoffs, for the initiating firm (A) and the responding competitor (R) depend both on the kind of action and the kind of response that these firms take.

A game theory framework is quite useful in modelling the relationship among actions, responses, and outcomes. However, although there is a large and growing literature on repeated games which focuses on multi-period competitive interaction (see Tirole 1988 for details), it is not possible explicitly to derive hypotheses relating number of responses and response lag to characteristics of actions from a repeated game theory framework. Due to the stringent assumptions specified by this model and other limitations of game theory at its current stage of development, as discussed by such theorists as Kreps (1990), the development of the following hypotheses will rely primarily on arguments from the stimulus response literature in social cognition.³

Hypotheses

The stimulus-response model discussed in social cognition (e.g., Kiesler and Sproull 1982; Mervis and Rosch 1981; Taylor 1983; Dutton and Jackson 1987) offers useful perspectives linking competitive actions and responses. Kiesler and Sproull (1982) point out that before an organization can respond to a stimulus, it must first become aware of this stimulus and become motivated to act. The implication of this line of reasoning for the study of competitive interaction is that competitors can offer **responses** to a competitive

³ Kreps (1990), a leading game theorist, discusses both the contributions and limitations of game theory in modeling competitive interaction. One limitation is that multiple equilibria are common in game theory models, and there is often no satisfactory way to choose a single equilibrium outcome. Second, achieving an equilibrium solution generally requires strong assumptions about players' objectives and tendencies, whereas players can quite rationally take a very different course of action which would not lead to an equilibrium. Finally, and perhaps most importantly, many examples of competitive interaction are too rich and full of possible moves and countermoves to be modeled by game theory, which requires very precise and somewhat simplified specification as to strategies available. As an example, Kreps cites the recently deregulated US domestic air-transport business, the industry from which the current sample is drawn: "In this fairly complex situation, players (rival firms) were unclear on what others would do, how they would behave, and what were their motivations. Each individual firm could try to make assessments of what others would do and choose accordingly optimal responses, but it would have been rather a surprise if the behavior so engendered resembled the equilibrium of any game-theoretic model that didn't begin with that behavior and then construct the model around it" (p. 138).

move (i.e., a **stimulus**) only if they are **aware** of the move, if they are **motivated** to respond to the move, and if they are **capable** of responding to the move. In the context of this study, for instance, competitors would be more aware of and motivated to respond to an action which directly attacks their key markets; they would probably be less capable of retaliation if the action were strategic or involved substantial implementation requirements. These elements of the stimulus-response model—**awareness, motivation, and capability**—provide a theoretical underpinning for studying the relationships between characteristics of actions and responses. The hypotheses developed below, which reflect this stimulus-response process, are organized in terms of four characteristics of actions.

Competitive Impact

The first step in predicting the number and the timing of responses is to determine an action's competitive impact in the market: which competitors are affected directly; and more importantly, how pervasive the impact is. Competitors affected directly by a competitive move are most likely to respond to it. Since different sets of competitors are affected by each competitive move, competitive impact should also vary accordingly. Some moves affect only a handful of competitors (small impact) while others are more pervasive (great impact). For example, the impact of a major airline's price cut in all its U.S. domestic routes (which involve all airlines) would differ from a price cut in which only one city-pair is affected. The implications of these two kinds of move differ because they threaten a different number of competitors.

One would expect, naturally, that an action of great impact would lead to intense counteraction from a large number of responders. However, the implications of such a move go beyond the simple consideration of sheer numbers. Competitors are more likely to become **aware** of and **motivated** to respond to an action which has great competitive impact. Such a move would generally be considered more threatening and/or having higher market potential. Although competitors may initially be uncertain of the implications of such an action, its very pervasiveness will tend to impel them to react. If the action is perceived as a threat (e.g., a system-wide price cut), competitors will act to defend themselves; if it is perceived as an opportunity (e.g., a promising innovation), competitors will not want to be left out. Dutton and Jackson (1987) contend that when decision makers label a strategic issue an opportunity, they are more likely to take actions directed at changing the external environment (e.g., competitive responses).

Once a few competitors respond, others will tend to follow suit, creating a snowball effect (Farrell and Saloner 1985). So strong is the impetus to participate that some competitors may respond unnecessarily. Porter highlights firms' tendency to overreact when the total number of competitors affected is substantial: "... a manager may be better off if he makes an incorrect move in an expected value sense than all other competitors also make than if he does not follow competitors' behavior" (Porter 1984, p. 435).

By the same logic, an action with pervasive implications to many competitors will tend to provoke speedy counteractions. MacMillan et al. (1985) find that the broader the impact of a new product in the commercial banking industry, the shorter the competitors' response time. Thus an action with a great impact will elicit numerous and rapid responses.

Hypothesis 1. The greater the competitive impact of an action, the greater the number of responses.

Hypothesis 2. The greater the competitive impact of an action, the faster the responses.

Attack Intensity

Attack intensity reflects the degree to which the markets of a **given competitor** are threatened by an action. This variable captures the direct threat of a competitive action

to the various competitors **in the markets under attack**. While competitive impact reflects the pervasiveness of a move's overall effect, attack intensity focuses more on the effect of the move on an individual competitor: the former is concerned with **how many** competitors are affected by an action and thus may respond to it, the latter with **how strongly** this action attacks each of them.

A competitive move does not have the same effect on every competitor it threatens. The degree of threat an action poses to a given competitor will depend on the strategic importance to that competitor of the affected market. Competitors are often less **aware** of the implications of an action not specifically targeted on them and are also less **motivated** to react. Thus competitors would have different incentives to react, and their response behavior would be shaped by the impact of a competitive move on them.

An action's attack intensity is considered high for a competitor if the markets affected are important to it. For instance, Miller Beer in 1988 introduced "Miller Genuine Draft," according to Miller's president, Leonard Goldstein, "the first significant production from Miller whose demographic appeal is right in Bud's heartland" (*Wall Street Journal*, October 5, 1988, p. B1). Thus, from Anheuser-Busch's point of view, Miller's new product has high attack intensity.

Dutton and Jackson (1987) contend that decision makers are more likely to respond strongly to actions perceived as threats. If an action simultaneously threatens a **major proportion** of several competitors' markets, its **average** attack intensity on **all** competitors is thus raised. Such an action would be expected to provoke many responses.

Hypothesis 3. The greater the action's average attack intensity, the greater the number of responses.

Among firms that respond to an action, the degree of threat that action poses to their strategic markets should be a strong predictor of speed of response. Porter (1980) argues that a competitor is generally motivated to take quicker and stronger responses if an action is viewed as threatening. MacMillan et al. (1985) found that the extent of an action's strategic threat is negatively associated with response lag. It was also found that competitors who are highly dependent on a market react aggressively to the threat of a new entrant into that market (Tsai, MacMillan, and Low 1991). Thus if an action directly attacks the key markets of competitors, they are likely to respond quickly to show their commitment to defending the markets.

Hypothesis 4. The greater the action's attack intensity, the faster the responses.

Implementation Requirement

Executing an action generally involves organizational commitment on various levels, including some of the following implementation requirements: resource reallocation (Galbraith and Kazanjian 1986), inter-departmental coordination, reorganization of the existing procedures and structure (MacMillan et al. 1985), and coordination with external stakeholders, e.g., stockholders, investment bankers, and regulatory government agencies. The degree of difficulty in organizing these activities can be reflected in the amount of time required to implement the action.

The effects of implementation requirements on response are generally straightforward. If one assumes homogeneity among competitors in an industry, a responder's requirements should at least equal those of an initiator. Initiating a competitive action is generally part of strategy implementation for the initiator. Responding firms, on the other hand, are not always prepared to counteract competitive challenges raised in the market. They need time not only to understand and analyze the action but also to decide how to respond. Some competitors might lack the *capability* to take necessary responses, even if they have decided to do so. This is especially true in the case of actions with a high

level of implementation requirement, e.g., merger and acquisition, which usually require a substantial amount of time and resources to coordinate various stakeholders and to restructure the organization. Responses to this kind of action should be slow and few.

Hypothesis 5. The greater the action's implementation requirement, the smaller the number of responses.

Hypothesis 6. The greater the action's implementation requirement, the slower the responses.

Type of Action (Strategic vs. Tactical)

Previous researchers have organized various types of action into the broad dichotomy of "strategic" versus "tactical" (Porter 1980, 1985; Ansoff 1984; Dutton and Jackson 1987). Relative to tactical action, strategic action generally involves a more significant commitment of resources—especially investment in fixed assets (Galbraith and Kazanjian 1986), major reorientation or realignment of the organization-environment relationship (Thompson 1967), major change in the definition of the business (Abell 1980), reconfiguration of organizational structure (Galbraith and Kazanjian 1986), and radical changes (Dutton and Duncan 1987). In contrast, tactical action requires relatively minor, routine changes resolvable by middle- or low-level managers. Fewer resources are committed, and procedural modification can generally be substituted for structural reformation.

In predicting responses, general strategy theory (such as Porter 1980; Ansoff 1984) would expect that competitors will be more motivated and better able to respond immediately to tactical actions than to strategic ones. In support of Schelling's (1960) thesis, Porter (1980, p. 101) remarks: "If the firm can convince its rivals that it is committed to a strategic move it is making or plans to make, it increases the chances that rivals will resign themselves to the new position and not expend the resources to retaliate or try to cause the firm to back down. Thus commitment can deter retaliation."

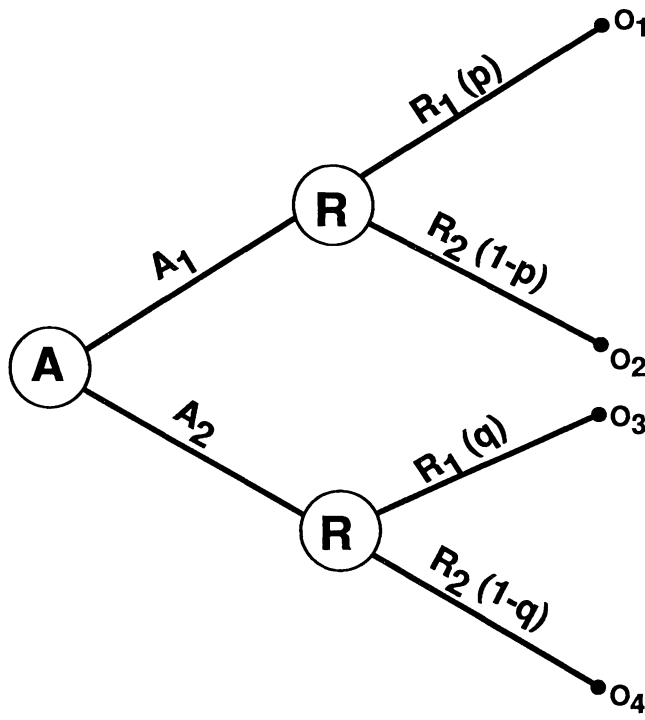
The effectiveness of strategic actions often remains uncertain for a long period of time (Wernerfelt and Karnani 1987). Consequently, competitors may be less motivated to respond until the uncertainty is removed. Moreover, responses to strategic actions will be fewer and slower, because of the difficulty in reallocating resources, and in implementing a major strategic reorientation and structural reformation. In contrast, competitors will be more familiar with the implications of a tactical action and will likely have experience on which to base a response decision. Since tactical actions often involve less uncertainty and fewer and more general resources, rivals will be more likely and better able to respond quickly.

Hypothesis 7. Strategic actions, relative to tactical ones, will provoke fewer responses.

Hypothesis 8. Strategic actions, relative to tactical ones, will provoke slower responses.

To summarize the ideas proposed above, let us expand the game tree previously developed (Figure 1) by allowing either of two responses to occur with each action. Figure 2 illustrates two sample actions the acting firm might choose: A_1 (a tactical move with large competitive impact, strong attack intensity, and low implementation requirement) or A_2 (a strategic move with small competitive impact, weak attack intensity, and high implementation requirement). The responding firm can choose R_1 (a quick response) or R_2 (a slow response). Given A_1 , there exists a probability p that the responder chooses R_1 , with probability $(1 - p)$ that it chooses R_2 . Given A_2 , there exists a probability q that the responder chooses R_1 and $(1 - q)$ that it chooses R_2 . It is hypothesized that $p > q$.

Extending this reasoning about response lag at the individual firm level to competitors at the industry level, one can expect a large number of quick responses to A_1 .



- A1: tactical action with large competitive impact, strong attack intensity, and low implementation requirement
- A2: strategic action with small competitive impact, weak attack intensity, and high implementation requirement
- R1: quick response
- R2: slow response
- O_i: outcomes, $i = 1, 2, 3, 4$
- $p, q, 1-p, 1-q$: probabilities associated with responses

FIGURE 2. A Framework for Predicting Response Lag.

Research Method

The research method selected to collect the data is similar to Miller and Friesen’s (1977), which has been labelled “structured content analysis” (Jauch, Osborn, and Martin 1980); it is also in line with Harrigan’s (1980) chronological identification of specific endgame strategic moves taken by firms in declining industries. The methodology is unique in that actual interactive competitive behavior of sample firms was directly identified from an extensive review of public information. In contrast to two previous studies using retrospective reporting by single informants (MacMillan et al. 1985; Smith et al. 1989), an objective criterion was developed to identify an action and its responses. A pre-designed, structured coding schedule was used to perform the content analysis.

Sample

Important competitive moves exchanged by 32 major U.S. domestic airlines (defined as those with annual operating revenues in excess of \$100 million) over the period from January 1979 to December 1986 constituted the sample of this research. This industry

was selected for study not only because of its acknowledged competitiveness and rigidly defined boundary, but also because it offers an identifiable set of competitors and a rich source of public information. In addition, the potential influence of the corporate-business relationship on intraindustry competition should be minimized, since almost all airlines are single business or dominant business firms (Rumelt 1974).

Data Collection

After a survey of various publications, it was concluded that *Aviation Daily*, a 50-year old industry journal, offered the most complete and detailed information on airline competition. Since *Aviation Daily* functions as an industry mouthpiece, aiming at objectively reporting airlines' announcements and actions, potential concern over the post hoc rationalization of competitive moves should be substantially minimized.⁴ Interviews with airline executives and industry analysts confirmed these observations.⁵

Identification of Actions and Responses

Competitive actions and responses were identified through an extensive eight-year review of **each** issue of *Aviation Daily*. This study exhaustively included all competitive actions that were mentioned in *Aviation Daily* and were counteracted by **at least one** competitor.⁶

A major challenge in studying competitive interaction, as noted by MacMillan et al. (1985) and Smith et al. (1989), is objectively identifying competitive responses. The method proposed here represented the first effort in the literature to respond to this challenge. Specifically, responses were distinguished from actions by searching out the following key words in *Aviation Daily*: ". . . in responding to . . .," ". . . following . . .," ". . . match . . .," ". . . under the pressure of . . .," ". . . reacting to . . .," etc. For example, *Aviation Daily* reported that ". . . under the pressure of American Airlines' planned [Nashville] hub creation . . . Piedmont revealed a statewide expansion program in Florida" (July 10, 1985). In this case, Piedmont's Florida expansion was identified as a response to American's hub creation.

The methodology of this study was extremely rigorous with regard to tracing streams of actions and responses and ultimately identifying the very earliest action in a sequence. To connect all responses to their initial actions, the procedure worked **backwards** through issues of *Aviation Daily* starting December 31, 1986 and ending January 1, 1979. Employing the key word method described, the authors first identified responses and then painstakingly traced back to find the initial reporting of the action.

The total sample consisted of 191 actions and 418 responses to these actions. To test the accuracy of the information published in *Aviation Daily*, a random subsample of 20 moves was drawn, of which 17 were cross-validated by other major publications. The high degree of confirmation (85%) indicates the reliability of the data. Since these publications covered these events much less comprehensively than *Aviation Daily*, only the

⁴ The emphasis of *Aviation Daily* on information release is illustrated further by the fact that 45 percent of the sample competitive moves from two years' data was formally announced by corporate executives at the level of senior VPs or above. Thus concern over the objectivity of *Aviation Daily* should be minimized.

⁵ One executive from United Airlines noted that *Aviation Daily* is "the bible of the airline industry. Nothing of significance escapes them." Another officer from Pan Am noted that "*Aviation Daily* is most accurate and very comprehensive." Similar comments were made by many airline executives and experts interviewed.

⁶ It should be noted that firms may also be using *Aviation Daily* to signal, confuse and bluff their rivals. Although the possibility exists that *Aviation Daily* may in some cases be reporting bluffs rather than actions which firms intend to carry out as advertised, the fact that we include only actions to which there was a response minimizes the number of such bluffs in the data set. In other words, if a firm's intentions are widely interpreted as a bluff, presumably there will be no response, and the action would thus not be included in the data set.

response lag and the number of responses could be further validated. The sample data on these two response variables were fully confirmed.⁷

Operationalization and Measurement

Competitive impact reflects the pervasiveness of an action's effect on competitors and was defined as the sum total of the competitors actually affected by an action. Competitors affected by each action were further defined as those airlines which provided service in at least one of the sample airports affected by the action. The 37 U.S. "large air traffic hubs," as defined by the *Department of Transportation*, were selected as sample airports. Those sample airports affected by each of the 191 actions were first identified based on the reports of *Aviation Daily*. The competitive impact of an action was determined by counting the total number of airlines which served in **at least one** of these airports affected. Data were drawn from *Airport Activity Statistics of Certified Route Air Carriers*.

Attack intensity was defined as the extent to which an action affects a given competitor's key markets: the greater the extent of the markets affected, the stronger the attack. The attack intensity of an action for **each competitor affected** was determined by the following measure: among passengers served by an airline in the year an action was taken, the **proportion of those passengers** affected by that action.⁸ For example, if an airline served a total of 250,000 passengers in a particular year, of whom 50,000 were affected by an action, an attack intensity measure of 0.2 would be assigned to this competitor. All the required data for this measure were drawn from the *Airport Activities Statistics of Certified Route Air Carriers*.

Implementation requirement was defined as the degree of effort an initiating firm requires to execute an action, as reflected by the amount of time spent preparing to execute that action. This measure was determined by the time difference between the date *Aviation Daily* reported an action and the date that action was executed as indicated in the journal.⁹

Type of action was defined and dichotomized as "strategic" or "tactical." An action was considered "strategic" if it involved significant investment in fixed assets and/or people/structure. In some cases strategic actions represented a radical departure from current industry norms. On the other hand, "tactical actions" did not involve significant commitments of fixed assets and had little long-term impact on the firm making the move. According to this definition, the authors classified various types of competitive moves as either "strategic" ($n = 33$) or "tactical" ($n = 158$).

More specifically, all sample moves were first deductively classified into 16 generic types. Some examples include merger and acquisition, price changes, promotion, expansion into a new market, service improvement, etc.¹⁰ The classification of these 16 types

⁷ As a further confirmation, the researchers contacted several airlines and interviewed key management personnel with regard to these sample action/response events. In spite of the constraints on their time, their hesitancy to reveal corporate information, and the difficulty of remembering the details of specific competitive exchanges which may have occurred over the last ten years, the interviewees were able to confirm fully three sample events. Moreover, no data were identified to the contrary of what *Aviation Daily* reported for the rest of the sample moves.

⁸ Different units of analysis were used: in predicting the number of responses, an action's overall attack intensity was developed by **averaging** attack intensity measures across **all competitors** affected by the action, while in predicting response lag, a **given responding competitor's** proportion of passengers affected by the action was used.

⁹ If no further report appeared in *Aviation Daily* indicating a change, the date of execution announced was assumed to be valid. Otherwise, this measure was recalculated, adjusting for the difference between the actual and the announced execution date. An action was excluded if its execution was later reported to have been canceled.

¹⁰ These 16 types of competitive moves include almost all the most important competitive methods identified by Levine (1987) in his comprehensive review of airline competition since deregulation. Competition in computerized reservation systems seems to be the only omission in the current study.

TABLE 1
Means, Standard Deviations, and Correlations

TABLE 1-1—Predicting Number of Responses^a

	Means	s.d.	1	2	3	4
1. Competitive impact	22.22	4.62				
2. Attack intensity	0.53	0.33	0.67***			
3. Implementation requirement	21.36	28.54	0.07	0.13*		
4. Type of action: Strategic action	0.17	0.38	−0.07	−0.08	0.38***	
5. Number of responses	2.19	1.85	0.29***	0.27***	−0.25***	−0.15*

TABLE 1-2—Predicting Response Lag^b

	Means	s.d.	1	2	3	4
1. Competitive impact	23.43	4.45				
2. Attack intensity	0.59	0.34	0.70***			
3. Implementation requirement	17.44	21.85	0.06	0.08†		
4. Type of action: Strategic action	0.09	0.29	−0.10*	−0.05	0.39***	
5. Response lag	10.78	18.23	−0.38***	0.07†	0.13**	0.41***

^a The unit of analysis is a competitive action ($n = 191$).
^b The unit of analysis is a responding competitor ($n = 418$).
† $p < 0.10$.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$. (The null hypothesis is of zero correlation.)

into “strategic” and “tactical” categories was achieved with total agreement among all three authors, who had coded these independently. For example, expansion into a new market was classified as “strategic” and price cut as “tactical.”¹¹

Number of responses was defined as the total number of competitors who actually respond to an action. It was determined by counting the number of airlines that responded to an action as reported in *Aviation Daily*.

Response lag was defined as the length of time a competitor takes to respond to an initiator’s competitive action. It was measured as the number of days between the date a specific action was first reported in *Aviation Daily* and the date that journal first made public the airline’s response.

Statistical Analysis

The OLS multiple regression analysis was used to test the hypotheses whereby the four characteristics of actions were regressed on number of responses and response lag.

Means, standard deviations, and correlations for all variables used in regression analyses are presented in Table 1.

Equations (1) and (2) in Table 2 present regression coefficients and related statistics for testing the hypotheses.

¹¹ To confirm the validity of the classification, a questionnaire was distributed to six management professors with expertise in competitive strategy and the airline industry. The respondents were requested to categorize various actions as strategic or tactical, using the definitions described above. The interrater reliability was 1.0 or perfect for 15 items and 0.83 for one item—there was only one misclassification.

TABLE 2
Regression Analysis of Response Characteristics

Equation number	Number of Responses	Response Lag
	(1)	(2)
Competitive impact	0.0774* (0.0387)	0.0037 (0.2656)
Attack intensity	0.9555* (0.5776)	6.7366* (3.5140)
Implementation requirement	−0.0074† (0.0051)	0.2035*** (0.0413)
Type of action ^a (Strategic)	−0.9257** (0.3831)	20.1727*** (3.1418)
Intercept	0.2853 (0.7119)	1.2774 (5.0519)
R ² (Adjusted) coefficient of multiple determination	0.1538 (<i>n</i> = 191) ^b	0.2298 (<i>n</i> = 418) ^b
F-test significance of multiple determination coefficient	8.68***	28.97***

Standard deviations are in parentheses.
^a Type of action is a categorical variable composed of two types of action: strategic (=1) and tactical (=0).
^b The unit of analysis pertaining to response lag involves an action-response pair. Thus, the size of the sample equals 418 (pairs). The unit of analysis relating to number of responders is an individual competitive action. Thus, the size of the sample equals 191 (actions).
† *p* < 0.10.
* *p* < 0.05.
** *p* < 0.01.
*** *p* < 0.001. (The null hypothesis is that the corresponding parameter equals zero.)

Number of Responses

As indicated in equation (1) in Table 2, the result on competitive impact was consistent with *Hypothesis 1*: the greater the competitive impact of an action, the more responses it will provoke. *Hypothesis 3* was supported: the stronger an action’s attack on key markets of competitors, the greater the number of counteractions. There is support for *Hypothesis 5*: the greater the action’s implementation requirement, the smaller the number of responses. *Hypothesis 7* was also supported: the number of competitive responses associated with strategic actions is smaller than that of tactical actions.

Response Lag

As equation (2) in Table 2 shows, *Hypotheses 6 and 8* were supported: an action which requires more effort to execute is associated with a longer response lag, and response lag to strategic actions is longer—on average, 20 days—than to tactical ones. The result on competitive impact was not significant, suggesting no support for *Hypothesis 2*. Contrary to *Hypothesis 4*, when competitors’ key markets are strongly threatened, they tend to retaliate slowly. There are several possible explanations for this somewhat unexpected result. First, competitors may respond cautiously to major threats for fear of precipitating escalating retaliation. Therefore they will react decisively, but slowly, for fear of the initiator’s retaliation. The fear may come from at least one of two sources: (1) the initiator is a powerful or credible player in the markets where the battle is engaged, and (2) the action is taken in the initiator’s bread-and-butter markets; thus the initiator will be more committed to the action and more motivated and prepared for the next run of battle.

Analyses were performed to explore the plausibility of these explanations. A test for the first condition, in which the initiator is a powerful player in the market, is to see if response lag increases with the size of the initiator in the markets where an action is taken. A highly significant positive relation between response lag and the sum of passengers currently “owned” by the initiator in these markets supported this possibility ($r = 0.16$, $p < 0.001$). A test for the second condition, in which the action is initiated in the initiator’s key markets, is to see if response lag increases with the strategic importance to the initiator of the affected markets. Its plausibility was supported by the significant positive correlations between response lag and the following measure: among airports served by the **initiator** in the year an action was taken, the **proportion of passengers** affected by the action ($r = 0.09$, $p < 0.05$). Based on these two findings, it seems reasonable to suggest that an initiator’s reputation as a powerful and committed player in the markets from where the move is taken makes competitors react less aggressively, presumably for fear of escalating retaliation.

Discussion

This study was concerned with how competitors **interact** in the market via the ongoing exchange of competitive moves. The principal purpose of the research has been to provide empirical evidence regarding the determinants of number of competitive responses and response lag. Four predictors of competitive responses were derived from Schelling’s (1960) key constructs of commitment and threat. A primary conclusion of this study is that number of responses and response lag may vary systematically according to these characteristics of initial actions. Significant empirical evidence has been provided to suggest the following:

The number of competitors affected by an action and the strategic importance to these competitors of the markets under attack **increase** the number of competitive responses. By contrast, strategic actions or actions which have high implementation requirements **reduce** the number of competitors’ counteractions.

Strategic actions, actions which require substantial implementation efforts, or actions which pose a strong threat to the key markets of competitors **delay** competitor retaliation.

As expected, strategic actions, in contrast to tactical ones, reduce the number of competitors’ counteractions **and** impede the speed of response. Although the moderate sample size for strategic actions ($n = 33$) may have prevented even more revealing findings, it appears that strategic actions can minimize and delay rivals’ retaliations. On the other hand, tactical actions are likely to provoke a greater number of competitive responses and to minimize response lag. A greater number of counteractions taken with a shorter lag in response can potentially nullify the effectiveness of an action. Tactical actions, then, may not yield a sustainable competitive advantage and, in fact, may lead to intensified competition and potentially lower profit margins for all firms.

Consistent with the prediction, actions with high implementation requirement reduce the number of competitive responses, while increasing the time lag for those who respond. These findings suggest that most firms are unlikely to respond and to respond quickly to a competitive challenge which requires significant efforts to implement.

Both implementation requirement and type of action are used here as indicators of an initiator’s commitment. Strategic actions or actions with significant implementation requirements signify strong commitment on the part of the initiator. Therefore, the present study provides empirical support for the commonly noted yet statistically untested arguments proposed by Porter (1980) that commitment can deter retaliation.

On the other hand, the positive relationship between competitive impact and the number of competitive responses is consistent with theories advanced by Dutton and Jackson

(1987), Farrell and Saloner (1985), and Porter (1984) that many competitors would react, sometimes even unnecessarily, to actions which have broad impact in the industry. This finding, along with its insignificant relationship with response lag, seems to suggest that competitors' propensity to react may be influenced by how many competitors are involved in a battle, yet the sheer number of competitors affected has no influence on the speed of responders' retaliation.

Attack intensity was a salient predictor both of the number of responses and of response lag. The finding for predicting number of responses provides additional empirical support for the conclusion of Tsai et al. (1991) that competitors who are highly dependent on a market are more likely to react to the threat of new entry and is also in line with both Porter's (1980) and Dutton and Jackson's (1987) proposition that competitors are motivated to respond if an action is viewed as threatening.

However, the positive relationship between attack intensity and response lag is inconsistent with both the predictions and the findings of previous research (e.g., MacMillan et al. 1985). This result suggests that competitors who have a large stake tend to signal their displeasure by offering responses, yet they do so by taking slow and cautious counteractions presumably to avoid escalating retaliation. Additional analyses seemed to substantiate this argument further: the power and credibility of the initiators as well as their commitment to the markets in which the battle is engaged shape competitors' response behavior. The importance of a firm's reputation as a credible actor has been established in a game theoretic framework (Kreps and Wilson 1982; Milgrom and Roberts 1982). These models have illustrated that a powerful firm with a combative reputation can cause rivals to be less aggressive. For example, sharply lowering prices in the face of new entry can deter entry and in other ways intimidate rivals. This finding is also in line with the risk-averse propensity of decision makers in large-stake situations well noted in the decision making literature (Bass 1983).

Limitations

An important question is to what extent the results can be generalized. The U.S. domestic airline industry does possess some idiosyncratic features which, on the one hand, make it an ideal setting for testing the proposed theory, but, on the other, may affect the generalizability of the study. Competitive information is readily available because of the use of computerized reservation systems, the somewhat unusual industry publication *Aviation Daily*, and the carry-over effect from the regulation era of reporting operating information on a constant basis. However, some of these features may also be found in industries for which competitive information is readily accessible, such as financial service and consumer product. In addition, the airline industry has been undergoing a significant environmental change due to deregulation. Competitive interactions may be more frequently observed than normally since no companies want to be left behind in this new game. Further, airline competition exists on an airport-by-airport or route-by-route basis. There are at least two implications for competition at the individual product market level: the geographic focus and a clearly-defined market. Conceptually and methodologically rigorous measures of pervasiveness of competitive impact and attack intensity were specially developed for this situation. In reality, competition is most likely to occur at the product market/segment level. Thus the research method used in this study should be applicable to other industries such as beer, car rentals, soft drinks, automobiles, and banking.

The kind of competitive moves identified, the selection of important characteristics of actions and responses, and the significance of these characteristics in competitive dynamics may also vary across industries. However, the sampling of the action-response pairs to capture firm rivalry, the method of linking responses to their initial actions, and

the use of objective and thus replicable industry indicators, should be generalizable to studies of competitive dynamics across a variety of industries.

Finally, this research sampled only competitive actions which actually provoked responses; those actions with no responses were not included. Thus one must be cautious in extrapolating the results to situations where there may be no response. The results should be interpreted as determinants of number of responses and response lag **given at least one response**; they cannot predict the likelihood of response.

Implications

While the present findings are important, future research can make several extensions. Since the study deals only with competitive actions that attracted response from at least one competitor, examining actions that did not trigger responses would be valuable. Key research questions of interest include why these actions generated no response and how these “nonresponse” actions differ from the “response” ones.

Second, future studies should explore the characteristics of the firms which initiate actions and the process by which competitors decide to respond. This study provided preliminary evidence that the reputation of an initiator and its commitment to the move it takes may influence competitive reactions. Research along this line should be valuable. This study also suggested that awareness, motivation, and capability of a potential responder would determine its likelihood of responding. The relationships between each of these response determinants and various characteristics of action and response should be formally assessed.

Third, rivalry was examined here in the specific context of the markets affected by a competitive action; competitors were defined as those firms which serve in at least one of these markets. Thus market commonality becomes important in defining a firm's competitors. The degree of **dependence** on a particular market was found to be an important predictor of competitive behavior. This conceptualization of competition and competitor should provide a more meaningful approach than those used in previous research, which relies on the similarity of strategic posture using cross-sectional survey information and/or year-end financial data.

Finally, and perhaps most importantly, future advances in game theory may allow complex competitive interactions, such as those included here, to be modelled more fully. Kreps (1990) recommends that game theory research pay more attention to non-equilibrium and disequilibrium notions in game theory models, re-examine the behavioral assumptions commonly used, and investigate in more detail the real-world complexities of competitive interaction. This study represents a step in that direction.

In recent years game theory approaches have considerably expanded our understanding of strategic decision-making in the face of potential competitive responses. However, when only incomplete information is available, as is commonly the case, both the strategist and the strategy researcher must find ways to estimate the distribution of payoffs for opponents; any technique that can be used to decrease the variance of the estimated distributions of payoffs should be valuable. For instance, the expected payoff for the responder can be inferred from the attack intensity and competitive impact of the action. The variables proposed in this study, all amenable to direct measurement using public industry information, should be valuable for future studies which attempt to model more formally real-world competition using game theories.

These findings should ultimately be valuable to practicing strategists. For example, a key question for an initiator is whether an action can be designed so as to reduce the number of responding firms and/or delay responses. The attributes of competitive actions identified and empirically validated in this study may provide a useful frame of reference in pursuing these strategic objectives.

In summary, the present study contributes to an under-researched, yet very important, area in strategic management. The focus on competitive actions and their responses provides some preliminary evidence that the characteristics of actions can be important determinants of responses. The emphasis on actual competitive behavior, by identifying an action and tracing its responses, should add substantially to a better understanding of the ongoing dynamics of competition.¹²

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