

## COMPETITIVE DYNAMICS RESEARCH: CRITIQUE AND FUTURE DIRECTIONS

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## **ABSTRACT**

The decade of the nineties witnessed a significant increase in business-level strategy research relating to the competitive actions and reactions carried out among competing firms. Rooted in the Schumpeter' theory of creative destruction, this work has examined causes and consequences of firm-level action and reaction, such as new product introductions, promotions, pricing, and market signaling. In this chapter, we critically review the competitive dynamics literature in terms of underlying theory, methods and results.

Our review reveals that the strongest and most consistent empirical relationships include: the negative relationship between action/reaction timing and firm performance and the positive relationship between action/reaction aggressiveness and performance. This research also reveals that competitive reaction can be predicted based on characteristics of the action. These relationships hold up in a great variety of samples, as competitive dynamics research has been conducted on a great variety of firms and industries. However, we note a bias toward large, single business, public, domestic firms. The methods are also biased towards archival research, leaving opportunities to study management intentions. The chapter concludes with a discussion of alternative theoretical perspectives, which offer opportunities for expanding the domain of competitive dynamics research.

# **COMPETITIVE DYNAMICS RESEARCH: CRITIQUE AND FUTURE DIRECTIONS**

## **INTRODUCTION**

A series of actions (moves) and reactions (countermoves) among firms in an industry create competitive dynamics. These action/reaction dynamics reflect the normal and innovative movement of firms in pursuit of profits. Firms act creatively (introduce a new product, a new promotion, or a new marketing agreement) to enhance or improve profits, competitive advantage, and industry position. Successful actions (actions which generate new customers and profits) promote competitive reaction as rivals attempt to block or imitate the action. The study of competitive dynamics is thus the study of how firm action (moves) affects competitors, competitive advantage, and performance. Sometimes these actions and reactions can escalate among firms so that the industry performance is adversely affected; at other times, the pattern of behavior can be more genteel and profitable.

The importance of the competitive dynamics was highlighted in Schumpeter's (1942) theory of creative destruction. Schumpeter described the creative destruction process as a "perennial gale." This gale of competition is generated by the extraordinary profits earned by the movements or actions of the first moving firm. Indeed, in this dynamic gale, the gains obtained from leaders motivate other competitors to undertake actions or reactions in an attempt to overtake the leader and enjoy the same profits. Importantly, Schumpeter emphasized that as a result of this creative destruction process, no firm was safe from the market process of competition. Thus, Schumpeter argued that to truly understand profits and competition, one must examine the interplay and consequences of action and reaction. Over time, the creative actions of challengers whittle away at the leader's position, prompting an eventual leader dethronement and the beginning of a new battle.

Empirical research on competitive dynamics began in the 1980s with MacMillan, McCaffrey and Van Wijk (1985) study of competitor response times to easily imitated new products in the banking industry. Bettis and Weeks (1987) followed by examining stock market reactions to product moves and countermoves between Polaroid and Kodak in instant photography. Smith, Grimm, Chen and Gannon (1989) identified the characteristics of competitive actions that evoked speedy response in a sample of high technology firms.

During the early 1990s, a series of papers examining the antecedents and consequences of competitive action and reaction in the U.S. Airline industry were published (Chen, Smith & Grimm 1992; Chen & MacMillan, 1992; Chen & Miller, 1994; Chen & Hambrick, 1995; Miller & Chen, 1994; Smith, Grimm, Gannon & Chen, 1991; Smith, Grimm, & Gannon, 1992). Moreover, new action data sets have emerged. For example, in a study of software producers, Young, Smith and Grimm (1996) found that aggressive firms, those that engaged rivals with a greater number of actions, obtained the highest performance. In addition, Ferrier, Smith & Grimm (1999) found that industry leaders were dethroned by the aggressive speedy moves of the #2 challengers in a study of competition between leaders and challengers in 41 different industries. Most recently, Lee, Smith, Grimm and Schomburg, (2000) found that stock market returns to first movers and early imitators were greater than for late imitators in a study of new product rivalry in the brewing, telecommunications and personal computer industries.

Given all the recent research on dynamics, we believe that this is an appropriate time to take stock of the scientific developments in this new area of research and evaluate the progress. Accordingly, in this chapter we review and critique the theories, research studies and findings of competitive dynamics research. We conclude by setting a research agenda for the future that

includes a proposal for new theory and connections between competitive dynamics research and the resource based view and industrial organization economics.

Our review of the competitive dynamics research is centered around the empirical study of actions and reactions of firms within the strategic management literature. We take the position that markets are always in state of flux; in some cases, markets are moving toward equilibrium, in other cases they are moving away from equilibrium (D'Aveni, 1994; Grimm & Smith, 1997). However, as competitive dynamics researchers, we assume that markets never quite reach equilibrium. Accordingly, we will only selectively deal with game theory, and the larger body of micro economics research on action and strategy, which assumes that firms have a finite set of strategies and that it is the proper combination of strategy and actions that yield equilibrium solution. Figure 1, from Smith, Grimm, and Gannon (1992), highlights the relationship between actors and action, and reactors and reaction examined in this chapter. We use this Figure as an organizing device and present it now to guide the reader in our review of the literature.

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Overall, we analyzed over 30 published articles that focused on competitive dynamics. These included both conceptual and empirical contributions published primarily in management journals. To qualify for analysis, the articles had to focus on explaining or predicting competitive action, which was defined as a market-based moves designed to build or defend competitive advantage and performance. We read each of the articles and classified them according to independent variables identified in Figure 1.

## BACKGROUND

Much of the competitive dynamics research has been framed and motivated from Schumpeter's theory of creative destruction (e.g., Smith et al 1991; Smith et al 1992). Many years ago, Joseph Schumpeter (1942) developed the concept of "creative destruction" to explain the dynamic market process by which firms act and react in the pursuit of market opportunities. Creative destruction is defined as the inevitable and eventual market decline of leading firms through the process of competitive action and reaction (Schumpeter, 1934, 1950). In this dynamic context, the creative actions of leaders in pursuit of new opportunities elicit reactions from rivals in an attempt to destroy the advantages sought by the leaders. Indeed, according to Schumpeter, the manner or process by which leaders and challengers act and react determine their long-term performance and survival. According to this theory, innovative first moving firms enjoy transient monopoly advantages and abnormal profits by virtue of the lag in response by rivals (Nelson & Winter, 1982; Porter, 1980). Consequently, competitive dynamics researchers have attempted to empirically identify strategic actions that will benefit from a delay in retaliation, or making the moves as to maximize the delay (Chen, 1988; Smith et al, 1991). Figure 1 is consistent with Schumpeter's ideas on action and reaction: Firms act, and rivals react!

Young et al. (1996) and Ferrier et al. (1999) advanced the Schumpeterian ideas by integrating Austrian economics into the competitive dynamics stream. The Austrians believe, as Schumpeter did, that competition is a dynamic market process rather than a static market outcome, as neoclassical economists believe (Scherer & Ross, 1990). More specifically, market equilibrium (i.e., the lack of movement in prices, production quantities, or different quality levels, etc.) occurs only in the absence of competition. As such, the Austrians focus their attention on the processes by which market move toward and away from equilibrium. But, they

argue that markets never reach equilibrium because the profit forces for action will disrupt the stable state or status quo. To explain this disruption, the Austrians focus on the role of ‘entrepreneurial discovery.’ This is defined as the action of successfully directing the flow of resources toward fulfillment of consumer needs when as market opportunity arise (Jacobsen, 1992; Mises, 1949; Schumpeter, 1934). From a competitive dynamics perspective, entrepreneurial discovery has lead researchers to focus attention on the market and profit effects of innovative actions, such as radical actions or first movement behavior that disrupt the status quo.

Other key issues of competition from the Austrian perspective include strategic flexibility and resource heterogeneity (Jacobsen, 1992). First, successful firms possess the resources and flexibility to engage a variety of actions. Thus, the basis for creative destruction is as much attributed to the lack of strategic range in action by complacent firms as it is the inability or unwillingness to continually innovate or compete aggressively. In addition, through the process of entrepreneurial discovery, successful firms are able to accumulate, combine, and direct resources differently than other firms. That is, their range and scope of strategic actions are, at least for the short run, superior to that of rival firms. However, this strategic advantage will eventually be eroded through imitation. Indeed, a major focus of competitive dynamic research has been on the process of competition examined through competitive reaction (Smith et al., 1992) and imitation (Smith et al, 1991; Lee et al, 2000). Comparatively less work has been done on the accumulation of resources (see Grimm & Smith, 1997).

Schumpeter (1934, 1950) and Austrian literature has played a critical role in driving the development of key concepts for competitive dynamic researchers. For example, the emphasis on action and reaction in competitive dynamics research comes directly from Schumpeter (1934)

and Austrian economics, where action is the central unit of analysis (Mises 1949). The concept of action and response timing is also fundamental in Austrian economics as it is the risk taker or the entrepreneur who benefits from first action (Kirzner, 1973). Industry structure or the market process of competition is also prominent and fundamental in Austrian economics.

From this grounding in Schumpeter and Austrian economics, competitive dynamics researchers have focused their attention on the role of competitive action and reaction. Accordingly, we have identified three distinguishing characteristics of competitive dynamics research. The first attribute is the focus on the specific and real behaviors or actions of firms in the marketplace. It has been argued that actions are the vehicle by which firms position themselves in the industry (Porter, 1980) and build resource advantages (Barney, 1991; Grimm & Smith, 1997). Actions are unique in that they occur at a particular time and place. For example, a firm can introduce a new product, offer a free product service contract, start a new promotional campaign, or lower its prices dramatically; all in a desire to increase market share and profits. Each of these actions is distinctive with regard to the time they occur (day/month/year) and where (the market) they take place. With this action orientation, timing of actions and reactions has become a pivotal variable with substantial explanatory power (Smith, Grimm, Gannon & Chen, 1991; Lee et al, 2000). In addition, researchers have also examined the scope of action in terms of number of markets or customers affected (Chen, Smith & Grimm, 1992) and the influence of multimarket competition on rivalry (Gimeno & Woo, 1996, 1999; Young, Smith, Grimm & Simon, forthcoming).

The second characteristic of competitive dynamics research is its focus on competitive interdependence. Following Schumpeter (1934), research in competitive dynamics began with the conviction that the performance effects of a firm's strategy (action) depend upon the



competitive context in which the strategy is carried out. In other words, firms are not independent, they feel the moves of one another, and for whatever the reason, are prone to interact. In this dynamic action/reaction context, firm performance is not simply a function of the strategies and actions a firm undertakes, but it must be understood relative to the strategies and actions of rivals, or as Schumpeter (1934) described, the circular flow of competition. This is referred to as the competitive context. Thus, an important aspect of competitive dynamics research has been the construction of samples of firms that are interacting with one another. For example, Smith, Grimm, Gannon and Chen (1991) examined all the competitive actions of US domestic airlines to one another over a six-year period. Young, Smith and Grimm (1996) studied the actions of all software producers to one another over a ten-year period. Ferrier, Smith and Grimm (1999) studied the actions of matched leader-challenger pairs across 41 different industries. With a focus on the competitive context, competitive dynamics researchers center directly on the concept of rivalry, which is a fundamental aspect of all models of competitive advantage.

Finally, competitive dynamic research has broadly attempted to explain both the causes and consequences of action and reaction with particular emphasis on the performance consequences of these dynamics. For example, Lee, Smith and Grimm (2000) examined the performance effects of new product introductions and specifically how competitive imitation cut into the gains of first movers, and Schomburg, Grimm and Smith (1994) studied how industry structure impacted the order and timing of new product introductions.

## THE BASIC MODEL AND THEORY UNDERLYING COMPETITIVE DYNAMICS RESEARCH

Figure 1 provides an overview of the components of the model and the associated relationships as conceived by Smith, Grimm and Gannon (1992), which includes the actor (the firm that takes a competitive action), the competitive action (the type or magnitude of action), the responder (the firm that reacts), and the response to the action. The final two components include the industry context of competitive activity and the performance outcomes of competitive interaction.

### **The Actor**

The actor represents the firm carrying out a competitive action (Smith, Grimm and Gannon, 1992). In competitive dynamics research, the actor is important to the extent that it is the originator of an action and the beneficiary (both positive and negative) from the action outcome. One important element of competitive dynamics research has focused on how characteristics of the actor affect the actions the firm chooses to implement. Drawing from diverse streams of research, there are three implicit, yet essential organizational characteristics that influence strategic action (Chen 1996). These are factors that influence the *awareness* of the context and challenges stemming from competitive interdependence, factors which induce or impede the *motivation* to take action, and the cognitive and resource-based factors, which influence the firm's *ability* to take action.

Organizational characteristics that predict the characteristics of action can be broadly classified as a function of these three characteristics. For instance, *awareness* refers to how cognizant a focal firm is of its competitors, the drivers of competition within the industry, and the general competitive environment. The level of awareness is important because it affects the

extent to which a firm understands and comprehends the consequences of its actions within the competitive landscape (Chen, 1996). In prior research, organizational characteristics such as the age of the firm, the diversity of markets in which it competes, and top management team (TMT) demographics have been used to reflect the level of awareness.

A firm might be aware of its rivals and the competitive environment without necessarily being motivated to act. *Motivation* accounts for the incentives that drive a firm to undertake action. Motivation relates to perceived gains or losses, which stem from its belief of whether it stands to gain advantages from action or stands to lose if no action is carried out. Within competitive dynamics research, organizational characteristics such as past performance or market dependence have been used to reflect the motivation to act.

Action is the outcome of not only the deployment of resources, but also the firm's decision-making processes (Grimm & Smith, 1997). Within the competitive dynamics research, both impact the firm's *ability* to act. Indeed, organizational resources such as unabsorbed slack (i.e., liquid financial resources) are required to undertake actions. Further, TMT demographics are also linked with the speed with which actions (and responses) are conceived of and implemented. Thus, despite being both aware and motivated to carry out action, these organizational characteristics underscore the importance of the ability to carry out action.

### **Competitive Action**

As noted, most of the research on action is based on the writing of Schumpeter's theory of creative destruction and Austrian economics, where firm action is a central part of the market process. Indeed, firms create and defend competitive advantage by positioning themselves relative to competitors "...by creating new ways of doing things and new things to do" (Kirzner, 1973: 79). Building on this view, research in competitive dynamics has developed theory and

empirical methods centering on a fine-grained conceptualization of firm strategy as competitive action, the principal vehicle by which firms position themselves in the competitive environment (Smith, Grimm & Gannon, 1992). Accordingly, the definition of competitive action serves as the conceptual foundation for this research stream. Competitive action [and response] is generally defined as *externally directed, specific, and observable competitive move initiated by a firm to enhance its relative competitive position* (e.g., Chen et al., 1992; Ferrier et al., 1999; Smith et al., 1991, 1992; Young et al., 1996, etc.). As discussed above, the research has explored the antecedents and consequences of competitive actions across several different industries. Hence, each industry is likely to differ with respect to the particular types of actions carried out. However, the vast majority of actions are may be represented by the following general categories: pricing actions, marketing actions, new product actions, capacity- and scale-related actions, service and operations actions, signaling actions, etc. However, the most important contributions of this research stream examined the characteristics of action developed at several distinct levels of analysis and aggregation. Table 1 provides a comprehensive list of action characteristics and their definitions at different levels of analysis and aggregation.

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Insert Table 1 of Action Characteristics about here  
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First, the early view of competitive dynamics focused attention on the characteristics of *individual actions, responses*, and the relationship between *action-response dyads*. This research has shown, for example, that the characteristics of an action (i.e., *radicality, scope, magnitude, irreversibility*, etc.) are important predictors of competitive response (i.e., *likelihood, speed*, etc.) (e.g., Chen et al., 1992; Smith et al., 1991; Smith et al., 1992). Other researchers focused on the

*order of moves*, that is, whether the firm was first to respond, second, and so on (Lee et al., 2000; Smith et al., 1992). McCaffrey and Van Wijk (1985), Smith, Grimm, Chen and Gannon (1989) and Chen and MacMillan (1992) studied the *radicality* of action, defined as the extent to which the action departs from existing action norms. Radical actions will be difficult for rivals to interpret and as such will lead fewer and slower actions. The *magnitude* of action concerns the amount of resources that are necessary to implement the action, whereas the *scope* of the action has been measured in terms of the number of competitors that are potentially affected by the action (Chen, Smith & Grimm, 1992). The degree of *threat* associated with an action has been measured in terms of the number of rivals' customers that are at risk to the action (Chen et al., 1992). It has been argued that as the magnitude of action increases, rivals will find it increasingly difficult to respond. However, as the scope and threat of an action increase, so too will the likelihood and speed of response (Smith, Grimm & Gannon, 1992).

Second, this stream of research has aggregated the characteristics and frequency of specific actions and responses carried out by firms over a finite time period – the *firm-year* (e.g., Ferrier et al., 1999; Young et al., 1996). Research at this level of aggregation has, for example, shown that the more *total actions* a firm carries out and with greater *average speed* (i.e., *aggressiveness*), the better its profitability or market share.

Further, this research stream has also viewed the firm's entire set of competitive actions carried out in a given year as a *competitive repertoire* and has developed several important constructs related to repertoire structure (Ferrier et al., 1999; Miller & Chen, 1994, 1995, 1996). For instance, competitive repertoire *simplicity* is defined as "...an overwhelming preoccupation with a single type of action – one that increasingly precludes the consideration of any others" (Miller & Chen, 1996). Competitive repertoire *nonconformity* refers to the tendency of a firm's

competitive repertoire to depart from the norms of industry. This includes sets of action types that are atypical in the industry. Nonconforming repertoires consist of types actions that are rarely being used by competitors or are void of those types of actions commonly used in the competitive arena (Miller and Chen, 1995). Competitive repertoire *inertia* refers to the level of activity that a firm exhibits when altering its competitive stance in terms of the number of market oriented changes it makes in trying to attract customers and outmaneuver competitors (Miller & Chen, 1994).

Finally, recent research has examined the characteristics of an uninterrupted *sequence* of competitive actions carried out over time. This view is consistent with prior research that conceptualized strategy as a logically unified chronological series of actions (Kirzner, 1973), patterns or consistencies in streams of behaviors (Mintzberg & Waters, 1985), a coordinated series of actions (MacCrimmon, 1993), or sequential set of many actions (D'Aveni, 1994). For instance, recent research has explored how a sequence of competitive actions exhibits the following structural dimensions: the number or *volume* of action that comprise the sequence, the average *duration* of an uninterrupted series of actions, the extent to which all possible types of action events are represented in the sequence (*complexity*), as well as the within-firm variability (unpredictability) and the between-firm variability (*heterogeneity*) of a firm's sequence of competitive actions carried out over time (Ferrier, 2000; Ferrier & Amburgey, 1999; Ferrier & Lee, 2000).

### **The Reactor**

While all firms can take action, they are also capable of responding to the actions of rivals. In fact, drawing from the early work of Talcott Parsons, the conceptual counterpart to a competitive action is a competitive response. Thus, firms that respond to the competitive actions

of rivals are labeled responders (Smith, Grimm, Gannon & Chen, 1991). This implies, of course, that responders possess all the organizational characteristics and attributes that pertain to actors (i.e., size, TMT demographics, etc.). However, the competitive dynamics literature has identified certain attributes, especially related to the information-processing capabilities of responders, that are most pertinent for a firm to respond. These attributes include the *external orientation* of the organization, its *structural complexity*, and its *market dependence*.

The information processing perspective on competitor analysis proposed by Smith, Grimm and Gannon (1992) provides a useful framework for understanding a firm as a reactor. Each competitive action carries a message, be it in terms of intent of the action or a signal relating to the strategy of the actor. To successfully compete, a firm should be able to decode the message embodied in an action (Smith et al, 1991). How a firm perceives and interprets an action will determine the nature of its response. As such, perceiving (via sensory capabilities) and interpreting the message embedded in the action represent crucial capabilities of the reacting firm.

A firm cannot conceive of and implement a competitive response without first realizing that a competitor has carried out an action (Smith et al, 1991). A firm's sensory systems represent its environmental scanning capability. Miles and Snow (1978) argued that firms differ in the richness of their sensory devices based on their orientation. Defenders for example, focus mainly on production and operating efficiency that makes them more internally focused. Prospectors on the other hand are more externally oriented as they actively analyzing the environment in search for opportunities. Such firms have richer sensory or boundary-spanning devices such as sales and customer relation employees. In addition, single or dominant business firms because of their

reliance on a particular market generally possess richer sensory mechanisms in that particular market.

Rich and timely information on competitor actions is useless to a firm if it cannot process this information. A firm's information processing and analytical mechanisms provide it with a means of interpreting the actions of rivals. This capacity to process information and analytical mechanisms are largely determined by an organization's internal structure (Huber and Daft, 1987). Organizational structure can vary in terms of number of dimensions, but Smith et al (1991) focus on the number of levels in the hierarchy the information must pass from when it leaves the boundary-spanners to when it reaches the decision-maker. When an organization has a complex structure, the potential for information transmission failure increases.

### **Competitive Response**

When a firm undertakes an action that generates abnormal profits or an action that affects a rival's position, competitors will be motivated to respond (Schumpeter, 1950). Porter (1980) defines a competitive response as a clear-cut, discernable counteraction carried out by the firm to defend or improve its position with regard to one or more competitors' initiated actions.

Competitive dynamics researchers have developed ways to capture firms' responses in the marketplace. For instance, Smith et al. (1991: 447) used content analysis of news items found in *Aviation Weekly* to distinguish competitive responses from competitive actions carried out by airlines based on the appearance of key words that denote response, such as: “... *in responding to...*,” or “...*reacting to ...*” Based on this approach, an entire series of studies developed several important characteristics of competitive responses. As listed in Table 1, some researchers measured *response likelihood*, *response type*, *response lag*, and *response order* (Lee et al., 2000, Smith et al., 1991). Other researchers developed measures such as *response noteworthiness*,



*response scope*, and *response generation speed* (Chen & Hambrick, 1995; Hambrick, et al., 1996).

Response likelihood represents the extent to which a rival is likely to respond to a firm's action (Smith et al, 1991). It has measured as the historical proportion of times a firm reacts to a rival's action in a given time period from the total number of times the firm had the opportunity to respond. Thus, a firm that has responded to nine out of ten of a rival's actions is more likely to respond in the future than a firm that has responded one out of ten times.

In deciding to respond to a move, competitors have a wide variety of response options available at their disposal. One key dimension of responses is to imitate the initiated action. Response imitation is defined as the extent to which a response mimics or is identical in type and form to the initiated action (Smith et al, 1991). A response that duplicates or matches a competitor's move provides a powerful signal to the acting firm that the rival is committed to defending their market position (Chen & MacMillan, 1992).

Porter (1980: 98) argued, "Finding strategic moves that will benefit from a delay in retaliation, or making moves so as to maximize the delay, are key principles of competitive interaction." Response lag or response delay represents the amount of time that elapses between a competitive action and the initiation of a response. During this time lapse, the actor gains economic rents from the action, provided it is a "successful" action (Smith, Grimm, Chen & Gannon, 1989), whereas non- or slow-responding rivals often experience market share losses or missed profit opportunities (Lee et al., 2000; Smith, Ferrier & Grimm, in press). The longer the response delay, the less obvious is the connection between the action and the response, thus reducing the power of the response as a signaling device (Chen and MacMillan, 1992).

Another dimension of competitive response is the *response order*. This is "...the position in a temporal series of responses a firm occupies" (Smith et al, 1991: 62). Since actions generally affect multiple competitors, there is usually more than one firm that responds to a competitive action. Response order represents the firm's ranking in the order of responses (among multiple responding rivals) to a competitive action. Thus, a firm could be the first to respond, second to respond or a late responder. The concept of *response order* is distinct from *response delay* in that the former represents a firm's ranking in the series of responses, whereas the later represents the elapsed time between the action and the response (Lee et al., 2000; Smith et al., 1991).

### **Industry Competitive Environment**

Competitive interaction occurs within the context of a given industry structure or environment. As with the effect of organizational characteristics on action, the characteristics of the competitive environment are thought to influence the firm's awareness, motivation, and ability to carry out action. Competitive dynamics researchers have examined traditional measures of industry structure, including industry growth rates, concentration and barriers to entry (Scherer & Ross, 1990). With regard to theory, researchers have borrowed from the structure-conduct-performance paradigm to predict relationships between industry structure and competitive action and reaction (Scherer & Ross, 1990). For example, it is argued that when industry growth rates and concentration are high, the level of competitive activity will be low, or that when barriers to entry are high, competitive response will be infrequent (Schomburg, Grimm & Smith 1994).

### **The Consequences of Action**

Competitive interaction is not an end in and of itself. Firms engage each other (i.e., undertake actions and responses) to achieve certain competitive outcomes. Competitive

dynamics has generally used common measures of performance as the dependent variable, including: changes in market share (Chen & MacMillan, 1992; Ferrier et al, 1999), cumulative abnormal returns to shareholders (Lee et al, 2000), sales growth (Ferrier, 2000), as well as accounting measures of profitability and profit growth, such as return on investment (Hambrick et al., 1996; Smith et al, 1991; Young et al 1996). However, several studies of the effects of action on performance in the airline industry use an industry-specific measure of performance – operating revenue per available seat-mile – that accounts for efficiency, aircraft load factors, and revenue (Chen & Hambrick, 1995; Miller & Chen, 1994, 1995, 1996).

Gaining market share to maintain industry leadership, dethrone an industry leader, or reduce the market share gap held leading competitors is an important objective of many firms. High market share generally leads to higher profits stemming from economies of scale, market power, and reputational advantages (Anderson & Zeithaml, 1984; Buzzell, Gale & Sultan, 1975; Porter, 1980). Moreover, market share is also measure of relative standing vis-à-vis competitors and, more importantly, managers *believe* that it is associated with higher profits (Armstrong & Collopy, 1996; Song, DiBenedetto & Zhao, 1999). Accordingly, a firm's change in market share serves as an important organizational outcome for firms because it represents both growth (or decline) relative to rivals, as well as profit potential.

Shareholder wealth is generally represented by stock market returns and is another primary objective of management. Through event study analysis, abnormal stock returns has also been linked to organizational actions (Bettis & Weeks, 1987; Ferrier & Lee, 2000; Lee et al., 2000). This measure is particularly important because it can be used to analyze both the *antecedent* and *contemporaneous* relationships between performance and individual competitive actions, as well as the firm's entire series of actions carried out over time.

The third dimension of competitive outcomes consists of common year-end accounting profit measures such as return on investment, net income, and return on equity. To link actions with year-end profitability, the firm's actions must be aggregated to firm-year level of analysis. This provides the rationale for the study of actions aggregated to the firm-year, action repertoires, or sequences of actions.

In this section, we provided a brief overview as to the components of the model that included the alternative ways in which actors, actions, reactors, reactions, and industry context have been studied. In the following section, we begin our review of the competitive dynamics literature in terms of the organizational, managerial, strategic, and context-related antecedents of action. This is followed by a summary of the research that explores the interdependent relationship between competitive action and competitive response. We then highlight the important contributions of this research stream in terms of the relationship between action (at all levels of analysis) and organizational performance. Finally, we conclude the next section with our views of this research stream's strengths and limitations and offer some directions for future research.

### **SAMPLES STUDIED IN COMPETITIVE DYNAMICS RESEARCH**

Competitive dynamics researchers have employed two basic methodologies. First, field studies in which researchers gathered primary data on action and reactions were prominent in early period of competitive dynamics research. These studies involved intensive examination of small samples of firms in order to identify actions and reactions of firms and to test relationships between organizational characteristics and action (e.g., MacMillan et al., 1985; Smith, Grimm, Gannon & Chen, 1988). During the 1990s, field studies gave way to secondary data studies where researchers gathered data on firm action and reaction from published records. These

archival studies allowed researchers to develop large samples of firm action and reaction and to study this behavior over time. We will review each of the methodologies in turn. The alternative studies are detailed in Table 2.

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### **Field Studies**

Field studies, or primary data gathering techniques, require the researcher to go out in the field to make observations on firm action and reaction. The first step in the data collection process has been to interview executives to identify actions and responses that their firm has taken. In the second stage, questionnaires have been developed to measure characteristics of actions and reactions and also to gather data on other organizational characteristics. In some cases questionnaire and interview data were supplemented with secondary data obtained from corporate records. These methodologies have been confined to small samples in single industries and involved cross sectional analyses of self-reported data.

Overall, there have been two field studies of competition among high technology firms, a study of competitive responses in the computer retailing industry, and a study of responses to new product introductions in the banking industry. The first high tech study focused on 22 electrical manufacturers, the second examined 25 high technology firms. The computer retailing study examined the competitive responses of 25 retailers and the banking study focused on 22 bank innovations.

Some scholars have also researched published case studies. For example, Bettis and Weeks (1987) employed published Harvard cases of the competition between Polaroid and Kodak to study the stock market reactions to new product actions.

### **Archival Studies**

Structured content analysis was developed in the late 1980s as a way of developing larger longitudinal data set that would not be bias by self-reporting (Chen 1988; Smith, Grimm, Gannon and Chen, 1991). Structured content analysis is based on a formal coding analysis that is applied to secondary data, such as newspapers, magazines and other published material. The contents of events are extracted according to predefined codes. With this methodology a series of competitive actions and reactions can be identified overtime and linked to other organizational and industry data that is also obtained from secondary sources. The archival studies have been conducted using five different samples of firms.

*Airlines.* Perhaps the most significant competitive dynamics research has involved the study of the U.S. domestic airline industry (Chen 1988). The airlines industry is one of the most competitive industries with a well-defined and known set of competitors. There is also an abundance of publicly available information that facilitates research (Smith et al, 1992). In addition, the airline industry has clearly defined boundaries and markets (routes) are easily identifiable facilitating the study of actions in specific markets (Chen, Smith and Grimm, 1992). The airline studies involved 32 different carriers over an eight-year period. *Aviation Daily* was the primary source of information on airline actions and responses. By using predefined key words such as 'reacting to', 'following', 'under pressure of' etc, researchers were able to identify 191 competitive actions and 418 competitive responses over an eight year period. Organizational and industry data supplemented the action data to provide examination of the

relationship between actors, action, reactors and reaction (see Figure 1) Examples of research using this data set include Chen (1988) and Smith et al (1992).

*Brewing, personal computers, and telecommunication.* These studies focused on the effects of new product interactions in the brewing, personal computers and telecommunications industries. Structured content analysis was used to identify new product introductions and respective imitative responses from the period 1975 to 1990 in each of these industries. The researchers focused only on new categories of products, that is, those that began with a firm's introduction of a new products category (e.g., the introduction of lite beer). *F&S Predicasts* index was used to identify 82 new product introductions categories and the 632 subsequent imitations. By studying new product categories (those that did not previously exist), the researchers could be certain who was the first mover. Also, by examining the imitations of products in the same category, the researchers could more clearly discern a competitive response and the timing of this response. The authors also gathered data on the structure of the personal computer, telecommunications and Brewing industry to study the effects of industry structure on competition (Schomburg, et al, 1994). The researchers also used an event methodology to test the shareholder wealth effects of these new product introductions and the imitative responses (Lee et al 2000). This was done by computing the cumulative abnormal returns emanating from a competitive actions or responses for a five day trading period window (two days before and two days after).

*Software.* The sample used in these studies consisted of all public single-business computer software firms (SIC codes 7371, 7372, 7372 or 7373), identified by both *Standard and Poor's Corporate Directory* and the *Disclosure* database of SIC filings for the years 1983-1991. These years were chosen because they were the formative years of the industry. The final

sample consisted of 345 firm-year observations involving nearly 2300 competitive actions and reactions. Again, *F&S Predicasts* index was used to identify actions and reactions and corporate records were screened to assess firm resources and industry structure. Because the data set contained the actions of nearly all firms in the industry and because these actions studied were within certain markets (e.g., word processing), the authors could distinguish between actions and reactions and study the effects of action and reaction on performance and the effects of firm resources and industry structure on action (See Young et al, 1996).

***Market share leaders and challengers in 41 industries.*** These studies focused on the competitive interaction between market share leaders and their respective number one challenger across 41 different industries. To identify leaders and challengers, a sample of U.S firms with 1993 sales exceeding \$500 million was selected and only firms identified to be single or dominant business firms were retained. Industries that did not contain at least two large non-diversified industry leaders and challengers between 1987-1993 were dropped. *F&S Predicasts* was also used to identify competitive actions and reactions. The procedure was similar to in the software and new product introduction studies. In all, nearly 5000 headlines and articles from over 700 publications (newspapers, magazines etc) were content analyzed. This sample yielded a total of 4,876 competitive actions and reactions. In each industry it was assumed that leader and challenger actions were taken with regard to one another. The authors studied the effects of characteristics of action and reaction on the likelihood of market share dethronement and market share erosion (e.g., Ferrier et al, 1999).



## EMPIRICAL FINDINGS

As we argued above, several important organizational level characteristics may influence the firm's awareness, motivation, and/or ability to carry out action. We first review the empirical studies that have studied and used characteristics of actors as a independent variable.

### Organizational Characteristics

**Organizational size.** Within competitive dynamics research, organizational size been conceived in different ways but the arguments have been consistent. The contention has been that large firms are better able to influence their environment and buffer themselves from competitors. As such, it has been argued that large organizations are better disposed to carry out more effective and timely competitive actions. Smaller firms, on the other hand, are nimble, flexible and inconspicuous thus possessing speed and stealth in their competitive actions (Chen and Hambrick, 1995).

The studies have provided some consistent findings pertaining to the effect of organizational size on competitive action. For instance, Chen and Hambrick (1995) found that relative to large firms, small firms are more likely to initiate competitive actions (*action propensity*) and do so more quickly (*action execution speed*). Other studies found that large firms are more likely to carry out more *total competitive moves* in a given time period (Young et al., 1994) and carry out actions that are strategic in nature (*action significance*) and *visible* (Chen & Hambrick, 1995). Further, Miller and Chen (1994) report that large firms are less prone to *competitive inertia* (conceptualized as the number of market-oriented changes the firm carries out to outmaneuver rivals in the marketplace), whereas another study by these authors (Miller & Chen, 1996) found that large firms are more likely to employ a *simple competitive repertoire*

(conceptualized as the firm's set of competitive actions consisting of only a few different types, as opposed to many different types).

The studies also produce some consistent findings with respect to the key dimensions of competitive response. For instance, large firms are more likely to respond to rivals' competitive challenges (*response likelihood*, *response propensity*) than small firms (Chen & Hambrick, 1995). Yet, the responses by large firms were found to be subtler and less *visible* (Chen & Hambrick, 1995). Also, with respect to the effect of firm size on the speed of competitive response, large firms were found to more quickly conceive of and announce responses to their rivals' actions (*response generation speed*) than small firms (Hambrick et al., 1996). However, large firms were slower than smaller firm in terms of the time elapsed between the announcement of their response and the actual implementation of the response (*response execution speed*) (Chen & Hambrick, 1995).

Research by Smith, Grimm and Gannon (1992) found that firms with a reputation as a market leader were more likely to attract responses and more likely to have their actions imitated. However, no support was shown for market leaders attracting faster responses to their competitive actions. In their study, market leader reputation was operationalized using a firm's market share for the previous year.

***Structural complexity.*** Bureaucracy and standard operating procedures hamper structurally complex firms, thereby diminishing decision-making speed and, consequently, the firm's ability to act and respond to competitive challenges. Indeed, Smith et al. (1991) found that the higher the firm's *structural complexity*, the less likely it responds to competitive challenges (*response likelihood*). Further, these authors also found that structurally complex

firms responded *after* other responding firms (*response order*). Unfortunately, this study found no relationship between structural complexity and *response speed* or *response imitation*.

**Organizational age.** As organizations get older, they repeat strategies and actions that have proven successful in the past (Lant, Millken & Batra, 1992; Miller & Chen, 1995). This “routinization” of action is based the idea that firms seek to reduce search costs associated with environmental scanning. As such, older firms become less aware of the competitive environment and more predictable in action.

Newer firms, on the other hand, suffer from the *liability of newness* stemming from institutional forces and resource constraints associated with youth (Miller & Chen, 1996; Singh, Tucker & House, 1986). Also, gaining familiarity with the industry’s history of past successful actions is time-dependent, thereby putting younger firms at a disadvantage. Accordingly, younger firms may want to avoid the competitive simplicity by undertaking a more complex competitive repertoire (Miller and Chen, 1996). In addition, younger firms often face an uphill battle to gain resources and institutional recognition from older firms and customers. This forces and motivates younger firms to continually scan their environment and track competitors for threats and opportunities that may arise.

Research that explored the effect of firm age on the characteristics of individual actions and responses has yielded little results. One possible explanation for the limited support of the effect of organizational age is its high correlation with market diversity and the size of the firm. Older firms are generally larger and compete in more diverse markets. This suggests that organizational size measures perhaps pick up most of the variance in action characteristics due to age. In these empirical studies, organizational age has been measured simply as the duration between the founding of a firm and the period in which competitive action was carried out.

However, prior studies have found significant results when strategy is conceptualized as year-end tallies of action or action repertoires. For instance, Young et al. (1996) found that older firms carry out fewer total competitive actions than younger firms. However, older firms carry out patterns of actions that exhibit less competitive inertia (Miller & Chen, 1994), conform to industry norms (Miller & Chen, 1995) and are less competitively simple (Miller & Chen, 1996).

***Multimarket competition.*** Most industries are composed of multiple markets, which are related in terms of resource characteristics, such as technologies, skills and competencies. Firms then can compete across multiple markets within an industry (broad scope) or they can compete more directly (narrow scope) in a single segment. A consequence of variation in firm scope across multiple market is that firms vary in the rivals they face in different markets, which has been referred to as multimarket contact (Edwards, 1955). When firms compete with other firms in multiple markets there is the potential for multiple point competition or “a situation when firms compete against each other simultaneously in several markets” (Karnani and Wernerfelt, 1985: 87). Multiple point competition theory suggests that when firms compete in multiple markets they have the potential to retaliate not only in the market where a move occurs, but also in other markets that may be more important to the rival. This ability to retaliate in each other’s markets should lead to mutual forbearance or a circumstance limiting rivalry. By contrast, a lack of multimarket contact may lead a firm to be more rivalrous with actions. Such a firm cannot retaliate in other market and therefore must be a more aggressive competitor in the markets it is in.

There have been only a few studies in strategic management that have examined the multiple point competition theory. For instance, Gimeno and Woo (1996) found a positive relationship between multiple market overlap and price/cost margins in their study of airline

competition, suggesting that the greater the multimarket contact, the lower the rivalry. With a more dynamic measure of rivalry, Baum and Korn (1996) found that California commuter airlines decreased the rate of market entry and exit as their multimarket contact increased. Young, Smith, Grimm & Simon (forthcoming) examined the effects of software firms competing in multiple markets with the same competitors. They found that as multimarket contact increased between pairs of firms operating in the same markets, the frequency of firm action decreased, supporting the forbearance hypothesis.

In a related study, Smith et al (1997) examined whether the level of rivalry (action and reaction) was greater within or between strategic groups with a sample of domestic airlines. Overall, the results suggest that responses to competitive actions can occur both between and within groups. That is, airlines appear just as likely to respond to the actions of rivals from different groups as they are to respond to firms in their own group. The authors conclude that in the airline industry there are few barriers or impediments to firms in responding to the competitive actions of airlines in other strategic groups.

***Market dependence.*** Market dependence, strategic importance, and/or market salience, represent the extent to which a firm's revenues or profits are derived from a given segment of the market (Chen & MacMillan, 1992; Gimeno, 1999; Karnani & Wernerfelt, 1985). Thus, firms that are highly dependent on a given market (or customer segment) are more likely to vigorously defend their market positions.

Consistent with theory, the studies found that firms were more likely to respond (*response likelihood*) to competitive challenges in markets that they considered very important (*market dependence*) with actions that were large and substantial (*irreversible actions*) and often *matched* the attacking firm's actions (Chen & MacMillan, 1992). Interestingly, while market

dependence may indeed relate to an aggressive response once the firm is provoked, it nevertheless reduces the likelihood of a quick response. However, as mentioned earlier, this strong and consistent support could also be as a result of market diversity accounting for the effects of organizational size and age, characteristics with which it is highly correlated.

***Past performance.*** Research in strategic management has traditionally considered elements of financial feedback (e.g., profitability, sales growth, stock prices, etc.) as a dependent or outcome variable of firm performance (Chakravarthy, 1986). Yet, another important issue is how financial feedback influences the firm's future action (Thompson, 1967). Theory within organizational learning explains how discrepancies between organizational goals and actual performance influences the likelihood of action, aggressiveness, predictable behavior, and strategic change (Heiner, 1983; Lant et al., 1992; Starbuck, 1983). For instance, success gives rise to complacency and a persistent reliance on well-learned organizational routines, thus inhibiting new competitive action and strategic change (Lant, Milliken & Batra, 1992; Miller, 1990; Miller & Chen, 1994). Indeed, managers attribute (oftentimes erroneously) good past performance to their actions. This "superstitious learning" reinforces current mental models and reducing motivation for action and change (Barr, Stimpert & Huff, 1992; Hambrick & D'Aveni, 1988; Lant, Milliken & Batra, 1992). Poor past performance, however, provides motivation for the reevaluation of current mental models and provides motivation to try new approaches to competing (Miller & Chen, 1995).

The empirical research suggests that successful firms are less likely to respond to competitive challenges (Hambrick et al., 1996). Moreover, when responses are carried out, successful firms do so more slowly (Hambrick et al., 1996; MacFhionnlaioich et al. 1999). Further, good past performance induces firms to carry out competitive repertoires characterized

as having higher levels of inertia (Miller & Chen, 1994), simple action repertoires (Miller & Chen, 1996), and repertoires that conform to industry norms (Miller & Chen, 1995). Also, successful firms are more likely to carry out a simple (as opposed to complex) sequence of competitive moves over time (Ferrier, 2000).

However and contrary to predictions, good past performance was positively related to the total number of competitive moves the firm carries out (Young et al., 1996). However, recent studies explored the possibility of a curvilinear relationship between past performance and total action carried out. For instance, MacFhionnlaioich et al. (1999) found a U-shaped relationship between past performance and total competitive moves tallied at year-end. This might occur because very successful, dominant firms realize that in order to maintain their market-leading position, they must carry out aggressive, deterrent behaviors such as: predatory pricing, product proliferation, advertising, and increasing scale or capacity (Scherer & Ross, 1990). By the same token, that poor performing firms are likely to compete aggressively in an effort to improve their competitive positions (e.g., Fiegenbaum, 1990).

***Slack resources.*** Organizational slack is defined as the buffer or cushion of actual or potential resources that may or may not be currently in use (Bourgeois, 1981). Prior research generally recognizes two types of slack: unabsorbed and absorbed. Indeed, both varieties are related to the firm's actions and responses.

*Unabsorbed slack* represents liquid resources that may be deployed wherever needed, it gives the firm leeway in managing responses to competitive pressures or a changing environment. It also permits the firm to experiment with innovation, take greater risks, and be more aggressive (Cyert & March, 1963).

Hambrick et al. (1996) found that high levels of unabsorbed slack to be negatively related to the likelihood that firms will initiate a competitive attack, but when attacks are initiated, slack allows for faster execution. A high level of unabsorbed slack was also related to a lower response likelihood (Hambrick et al., 1996; Smith et al. 1991) and response imitation (Smith et al., 1991). Yet, high levels of unabsorbed slack resulted in firms carrying out more total competitive moves (Young et al., 1994) and carrying out a competitive attack of longer duration that also consist of a more complex sequence of competitive moves (Ferrier, 2000).

*Absorbed slack* represents resource investments in firm activities, such as plant and equipment and selling costs. High levels of absorbed slack reduces the firm's ability to respond (and respond quickly) to competitive attack (Smith et al., 1991). However, absorbed slack was not related to the total number of competitive moves, competitive repertoire conformity, inertia and simplicity (Miller & Chen, 1994, 1995, 1996).

### **Managerial Characteristics**

***Top management team.*** The upper echelons and strategic decision making literatures suggest that managerial experience, background, and cognition influence three key managerial activities: problem sensing facilitated by greater awareness, interpretation and enactment of environmental cues and signals, and decision making process that matches perceived problems with strategic solutions (Amason, 1996; Barr, Stimpert & Huff, 1992). Thus, competitive action can be predicted by examining the cognitive bases, values, and perceptions of top management (Hambrick & Mason, 1984). Competitive dynamics researchers have examined TMT size, experience, tenure and heterogeneity.

Research has generally provided a strong link between the composition of the TMT and competitive actions and reactions. For instance, large TMTs tend to carry out competitive



actions that were less visible and of a tactical (as opposed to strategic) nature (Hambrick et al., 1996). Furthermore, these authors found that large TMTs were less likely to respond to competitive challenges that smaller TMTs.

Experienced TMT are less likely to respond to competitive challenges carried out by rivals, and do so after other players in the industry have responded (*response order*) (Smith et al., 1991). Experienced TMTs, however, are more likely to carry out a complex competitive repertoire (Miller & Chen, 1996).

Highly educated TMTs are more likely carry out significant (i.e., strategic in nature), yet focused (i.e., limited in market scope) competitive attacks against rivals (Hambrick et al., 1996). Consequently, such actions garner much less industry attention (action visibility, noteworthiness) than highly visible strategic actions, thus provoking fewer total responses. Highly educated TMTs are more likely respond to competitive challenges (Hambrick et al., 1996) by matching the attacker's action in their response (Smith et al., 1991). Moreover, longer tenured TMTs appear less likely to initiate competitive actions, but are more likely and are better able to quickly respond to competitive challenges (Hambrick et al., 1996).

Management teams that consider marketing and R&D activities and departments to be relatively more important than finance-accounting and production activities are believe to exhibit an *external orientation* with regard to the company's strategy. While TMTs having an external orientation reduced the overall likelihood of responding to competitive challenges, they nevertheless generate faster responses (Smith et al., 1991, 1992).

Empirical investigation by Smith, Grimm and Gannon (1992) on the effect of TMT reputation on competitive responses found that TMTs with a reputation for predictability and

docile behavior were associated with less competitive responses and slower response by rivals. TMT experience was operationalized as the average number of years of within-industry.

With respect to functional and education background heterogeneity, as well as TMT tenure heterogeneity, the studies produced strong and consistent results. For instance, heterogeneous TMTs were more likely to initiate significant (*action propensity, strategic actions*) actions affecting many competitors across a broad range of customer markets (*action scope*) (Hambrick et al., 1996). However, heterogeneous TMTs were less likely to respond to rivals' actions. Yet, when responses were executed, heterogeneous TMTs were also more likely to carry out responding actions that were *visible*, and affected many competitors and customers (*action scope*) (Hambrick et al., 1996).

Few studies have been undertaken to explore the relationship between TMT heterogeneity and the characteristics of the firm's entire repertoire of actions. Further, what studies that were done, found no significant direct relationships between these variables (e.g., Ferrier & Lyon, 1998). However, in exploring the relationship between TMT heterogeneity and the characteristics of the firm's sequence of competitive moves, Ferrier (2000) found that heterogeneous TMTs were more likely to carry out more complex bursts of competitive activity (*sequence complexity*) that deviated from the sequences of moves carried out by rivals (*sequence heterogeneity*).

Consistent with expectations, heterogeneous TMTs decide on and implement actions (and responses) slower than homogeneous TMTs (Hambrick et al., 1996). Similarly, Ferrier (2000) found that heterogeneous TMTs were less capable of sustaining competitive attacks of significant duration.

## Reputational and Strategic Characteristics

**Reputation.** Although the study of organizational and managerial characteristics may indeed provide insight as to a company's future actions, an examination of the firm's past behavior may arguably be the most important indicator of future behavior. When a firm's historical actions are consistent and predictable, other firms ascribe certain tendencies or reputational characteristics to the firm. Thus, reputation reflects information relating to the credibility of the firm as a competitor. For example, firms that frequently cut prices to gain/maintain market share are often viewed as predators (Smith et al, 1992). Reputation as used in competitive dynamics research has been defined as the positive or negative attribute ascribed by one rival to another based on past competitive behavior (Wilson, 1985; Smith, Grimm and Gannon, 1992).

Smith et al, (1992) measured a firm's reputation by the number of competitive actions it carried out in the previous year. More specifically, the number of *strategic actions* carried out in the previous year were summed up to operationalize the firm's reputation as a *strategic player* and the number of *pricing actions* were summed up to represent the firm's proclivity to be a *price predator* (Smith et al., 1992). The studies also suggest that firms with reputations as *strategic players* elicited slower responses to their competitive actions and a lower likelihood that rivals imitated their actions. Firms with a reputation as *price predators* generated faster responses to their competitive actions. However, contrary to expectation, price predators had less imitation of their competitive actions. The results also showed no relation between a firm's past competitive reputation and the number of responses to its actions.

**Generic strategy.** Only one study that we know of examined the relationship between the firm's overall strategy or strategic position and action. Based on Porter's (1980) generic

business-level strategies, Smith et al. (1997) classified airlines into three strategic categories: *large-scale, low-cost players, marketing-focused differentiated players, and smaller niche players*. These authors predicted that each firm's strategy type would influence its competitive activity. Firms following a low-cost strategy carried out more total actions (mostly price cutting actions) and were more likely to instigate or initiate rivalrous contact (Smith et al., 1997). Differentiated airlines were also prone to instigate rivalry, however they typically do so, for example, with marketing-related actions, such as offering new first-class services, etc. By contrast, niche players were less likely to instigate rivalry and carried out fewer total actions. With respect to competitive response, low-cost players were more likely to match competitive challenges with imitative responses, whereas differentiated players were less likely to carry out matching responses.

### **Industry Characteristics**

According to the structure-conduct-performance view within industrial economics, high levels of industry growth, barriers to entry, and industry concentration each buffer industry participants from intense competition (Scherer & Ross, 1990). Therefore, taken together, these important industry characteristics influence the firm's motivation to compete aggressively. We discuss each in turn.

***Industry growth.*** Industry growth is a basic indicator of industry demand (Schomburg, Grimm & Smith, 1994). Under conditions of high demand, rivalry is generally less intense than under conditions of low demand. Thus, slow growth frequently gives rise to more intense competition and lower profitability (Miller, 1990), which motivates strategic aggressiveness (Fombrun & Ginsberg; 1990; Smith et al., 1992). Several studies found strong support for the idea that industry growth influenced competitive behavior. For instance, firms in competing in

high growth industries respond to competitive challenges more slowly than firms in low growth industries (Smith et al., 1989; Schomburg, 1994). Further, high industry growth was associated with more *simple competitive repertoires* (Miller & Chen, 1996), predictable patterns of competitive actions (*sequence predictability*), and a reduced motivation to carry out sequences of competitive actions of significant *duration* (Ferrier, 2000).

***Industry concentration.*** Due to potential for oligopolistic coordination, a high level of industry concentration reduces the level of intra-industry competition, thereby reducing the firm's motivation to compete aggressively (see Scherer & Ross, 1990). In support of this, Young et al. (1996) found that higher levels of industry concentration resulted in fewer competitive moves carried out among incumbent firms. Also, industry concentration exhibited a negative relationship with action sequence complexity and differentiation (Ferrier, 2000). Schomburg et al. (1994) found that as the number of firms in the industry increased, response times and the radicality of action decreased.

***Barriers to entry.*** The barriers to entry literature also suggest that industries characterized by high levels of capital intensity, innovation, and advertising, for example, experience less competitive pressure from potential entrants. Barriers to entry were found to have a positive impact on industry performance principally because the intensity of competition among incumbents does not increase due to entry (Caves, Fortunato & Ghemawat, 1984; Scherer & Ross, 1990). Therefore, firms competing in industries characterized as having high barriers to entry are less motivated to compete aggressively.

In support of this, firms competing in industries characterized as having high barriers to entry carried out less complex and more predictable sequence of competitive moves (Ferrier, 2000). Schomburg et al. (1994) found that as barriers to entry decreased, the perceived threat of

competitive actions increased, thereby reducing the motivation for firms to carry out actions that deviate from the industry norm (*radicality*).

***Other industry characteristics.*** One study developed a composite measure of *favorable industry structure* consisting of factors relating to the number of competitors, industry growth, and industry concentration (Smith et al., 1996). Findings suggest that when competing in such competition-favorable industries, firms were *slow to respond* to competitive challenges.

### **The Interdependence of Actions and Competitive Response**

As we noted above, an important distinguishing characteristic of competitive dynamics research is its focus on competitive interdependence. Indeed, Schumpeter (1950) highlighted the importance of this with his theory of creative destruction, whereby the successful first-moving firm elicits competitive imitation or competitive response. In this section we examine the relationship between action and reaction.

***Predicting response frequency.*** As noted above, actions may exhibit multiple characteristics. For example, actions that are more *strategic* in nature (as opposed to tactical) are more likely to have significant *implementation requirements*. Moreover, strategic actions with significant implementation requirements are also *difficult to reverse*. It is expected that these and other important characteristics will affect the likelihood, frequency, and timing of competitive responses in the marketplace.

Indeed, studies suggest that the characteristics of action do impact response. For example, actions that are strategic, have greater implementation requirements, and are irreversible, elicit fewer total competitive responses (Chen & MacMillan, 1992; Chen, Smith & Grimm, 1992). Also, actions that strongly and significantly threaten a large number of competitors (*competitive impact, action scope*) were more likely to elicit a larger number of

*competitive responses* (Chen, Smith & Grimm, 1992; Smith et al., 1992). Similarly, actions that targeted more and more of rivals' customers (*action threat, attack intensity, action centrality*) were also met with a high number of competitive responses (Chen & Miller, 1992; Chen, Smith & Grimm, 1992; Smith et al., 1992).

Furthermore, strategic actions and those that affect multiple competitors and customers are less subtle and draw significant attention. Thus, highly visible, noteworthy actions also elicit a large number of competitive responses (Chen & Miller, 1994).

***Predicting response lag.*** Another basic characteristic of a particular competitive action is its type (e.g., pricing, product, marketing, etc.). A key argument of competitive dynamics researchers is that the speed of competitive response will be a function of the initial action's type. Indeed, Smith et al. (1992) found that in a sample of firms competing in a wide variety of high-tech industries (e.g., long-distance data transmission equipment, integrated circuits, medical testing systems, etc.) that actions such as *price cuts* and *new advertising campaigns* elicited faster responses overall (i.e., averaging about 7 months) than actions such as *new product introductions* (average response time about 22 months).

Moreover, other studies suggest that strategic actions that require significant efforts to implement and are difficult to reverse cause a delay in competitive response (Chen & Miller, 1992; Chen, Smith & Grimm, 1992; Smith et al., 1992). However, actions that significantly deviated from the industry norm in terms of their radicality elicited faster responses (Smith et al., 1992).

The research also suggests that rivals responded slowly to actions that affect a large number of competitors (*action scope*) (Chen, et al 1992). However, the results relating to the extent to which an action threatens a competitor's key markets produced mixed results. On one

hand, actions carried out to steal customers away from rivals (*action threat*) was met with quick response (Chen, et al, 1992). On the other hand, threatening actions (*attack intensity*) elicited slower competitive responses (Chen, et al, 1992).

### **The Consequences of Competitive Action and Response**

The general model depicted in Figure 1 suggests that action characteristics predicts competitive response, which, in turn, impacts performance. As noted, a key principle in competitive interaction is to carry out actions that reduce or delay the likelihood of competitive response. Interestingly, research on the direct effects of the characteristics of individual has produced little results. The most fruitful areas of research have centered on the characteristics of competitive response, as well as the characteristics of the firm's entire repertoire and sequence of competitive moves.

***Individual actions.*** Early studies that explored how a particular type of action influenced performance produced only weak results. For instance, in their study of high tech firms, Smith et al. (1992) found that *new product actions* lead to mildly better performance than *pricing* or *advertising* actions. Moreover, even the classification of actions as strategic versus tactical was not related to performance (Smith et al., 1992).

Recent studies in a wider range of industries produced only marginally better results. In a study of competitive actions carried out among leader-challenger pairs, Ferrier (1997) found that market share leaders experience a mild erosion of their market share and profitability leads held over challengers by carrying out *marketing* and *capacity-related* actions, whereas *pricing* actions hastened market share and profitability erosion. However, the market share and profitability lead held by market share leaders was significantly eroded when challengers carried out *overt signaling actions* (i.e., non-behavioral actions defined as publicly made announcements, threats,



bluffs, etc.). Also, aside from exploring the impact of *action type* on performance, one study found that *action execution speed* was positively related to performance (Chen & Hambrick, 1995).

***Individual responses.*** Consistent with theory, firms that carry out actions that elicited fewer *total responses* experienced better performance (Chen & Miller, 1994). Several studies explored the effect of *response speed* on performance. On one hand, in the airline studies, a negative relationship was found between response speed and performance (Smith et al., 1991; Smith et al., 1992; Smith et al., 1996). Relatedly, Chen and Hambrick (1995) found that when small firms deviate from the industry norm in terms of their response speed, they experience poor performance.

On the other hand, when the studies also accounted for *response order* (i.e., the rank order in which competitors respond), response speed exhibits a stable positive relationship with performance across most industries studied (Lee et al., 2000; Smith et al., 1991; Smith et al., 1992). This suggests that other factors may influence the relationship between response speed and performance. Further, *response order* may also play an important role in its own right.

***Competitive aggressiveness and repertoires of action.*** Consistent with the hypercompetition and Austrian views of competitive interaction, the competitive dynamics research suggests that firms that compete aggressively will be exploiting more new profit and market opportunities and preempt rivals' own efforts to improve competitive position. Indeed, firms that carry out a greater number of *total actions* over a given time period relative to rivals experience better profitability (Smith et al., 1996; Young et al., 1996), market share gains, and are less likely to be dethroned by challengers (Ferrier et al., 1999).

In addition, firms that carry out more *complex repertoires* of competitive actions experience better performance than firms that implement simple repertoires (Ferrier et al., 1999; Miller & Chen, 1996). However, firms that execute few changes among the major strategic actions in their competitive repertoires (*inertia*) experience better performance (Miller & Chen, 1994). Moreover, Miller and Chen (1995) found a significant negative direct effect in the relationship between *action repertoire non-conformity* and performance. However, these authors also found that firm size and market diversity moderated this effect. In particular, large firms and those that compete against many and different rivals and target diverse types of customers experience better performance when they carry out a set of competitive actions that deviate significantly from the industry norm.

***Sequence of actions.*** Multiple competitive actions carried out over time can also be conceptualized as a unified sequence or series of actions, which is also linked to performance (Ferrier, 2000; Kirzner, 1973; MacCrimmon, 1993). Firms that carry out a complex sequence of actions consisting of a wide range of action types, for example, are more aggressive by attacking rivals on multiple fronts, thereby causing a delay in competitive response (D'Aveni, 1994). Also, aggressive firms surprise rivals by making changes in strategy to avoid being predictable (D'Aveni, 1994; MacCrimmon, 1993). Therefore, firms that carry out an unpredictable sequence of competitive moves also disrupt the pattern of competition among rivals, thereby causing a delay in competitive response (D'Aveni, 1994).

For instance, Ferrier (2000) found that firms experience higher profits and revenue growth when they carry out a sequence of moves that is more *complex, unpredictable, and differentiated* relative to rivals' action sequences. This study also suggests that firms experience better performance when they are able to sustain a competitive attack that consists of many

actions for significant *duration*. Another study found that positive stock market returns was also related to sequence unpredictability and complexity (Ferrier & Lee, 2000 SMS).

### **A CRITIQUE OF COMPETITIVE DYNAMICS RESEARCH**

As revealed in the foregoing sections, the competitive dynamics stream of research has provided a number of important contributions to business-level strategic management. Indeed, because the studies have shown strong support for the model depicted in Figure 1, this stream's focus on strategy as behavior, competitive interdependence, and explanations regarding the important antecedents and consequences of competitive action advances our understanding of competitive behavior and the relationship between these behaviors and performance.

More specifically, we believe that the general research model outlined in Figure 1 has been robustly supported across a wide variety of industries in which competitors carried out thousands of competitive actions and responses. For example, consistent support was found for the importance of action/reaction timing or speed (acting fast), action aggressiveness (taking many moves) and action repertoires (acting differently and in a manner more complex than rivals) in studies of competition among airlines, brewing companies, computer manufacturers, pre-packaged software, tobacco, a collection of high-tech industries, and a sample of leader-challenger pairs across 41 diverse industries.

Equally important, the studies have also provided a strong foundation for future research. However, we believe that the current state of the science in competitive dynamics research has reached an important inflection point. We believe two types of research are necessary if the potential of competitive dynamics research is to be more fully realized. First, we recognize that despite its contributions, there are indeed some limitations in the overall research model outlined in Figure 1. Thus, as we discuss more fully in the remainder of this section, future research

could “fine tune” this model by exploring behavior, competitive interdependence, and important antecedents and consequences in new industry samples, applying new methods and research designs, or other organizational and industry influences.

We also believe, however, that competitive dynamics researchers need to broaden the theoretical roots of their models and propositions. Thus, we believe that there is a great opportunity to reach beyond the general model by developing and integrating entirely *new* theoretical perspectives. We offer our ideas for new theory integration in the next major section titled: Toward a New Theory of Action.

***Samples.*** Initial field studies in competitive dynamics research were limited primarily by small samples, retrospective reporting, single respondents, poor statistical power, or inadequate attention to construct validity. However, researchers have dramatically improved their methods. These improvements were possible with the adoption of structured content analysis, which lead to the development of large longitudinal databases composed of secondary data from a variety of firms and industries. The strengths of these newer methodologies which depend on archival data include: 1) the variety of firms and industries studied (nearly 300 firms, 50 different industries); 2) the development of large samples of firms (averaging approximately 300 firm-years per study); and 3) the study of competitive dynamics over time where causality can be more safely be inferred.

However, despite the range of industries studied thus far, this still represents a relatively small sample of industries, given the scope and complexity of the industrial landscape. Also, the studies have largely been limited to exploring the general research model with respect to publicly held domestic firms operating as single businesses. Given that the global economy consists of many closely held private firms, as well as powerful overseas competitors, future research could

indeed explore the general model using new samples of firms, including global players, firms that have multiple lines of business, and firms that are structured to specifically engage in multimarket competition.

Finally, because of the “costs” associated with collecting and measuring the characteristics of competitive actions are high (see below), there appears to be a discernable trade-off between the strengths and weaknesses relating to both the “depth” of understanding that single-industry studies provide versus the “breadth” of understanding that multi-industry studies provide. More specifically, the former type of study explores competitive interaction among all firms in a given industry (e.g., Chen 1988, Young et al, 1996), whereas the latter includes only the largest few firms across multiple industries (e.g., Ferrier et al, 1999). Future research could explore the general research model with samples and methods that combine both breadth and depth.

**Methods.** As noted above, one of this research stream’s most significant contributions is the definition and measure of firm strategy as *competitive action* using structured content analysis of news articles and headlines. Across all studies, thousands of news articles, headlines and abstracts were systematically and painstakingly coded into individual competitive actions and responses. Importantly, this approach has yielded consistent findings across multiple industry contexts and levels of analysis. Research at the level of individual actions and responses, as well as the relationships among action-response dyads offers a fine-grained view of competitive interaction. Research at the repertoire or firm-year levels of analysis adds comprehensiveness to the overall research model by exploring the structural characteristics of the firm’s entire set of competitive actions. Studies that view strategy as a sequence of competitive

actions adds the notion of “process” to the research stream, whereby the temporal orderliness of competitive action also explains performance outcomes.

Moreover, some studies demonstrate consistent findings and construct validity using both content-analyzed and perceptual measures relating to competitive action, organizational characteristics, and industry characteristics. Most measures of competitive action, however, are drawn from archival sources. Further, this methodology (structured content analysis) for collecting and measuring competitive action is critically dependent on the newsworthiness of the firms and their competitive actions. Future research could fruitfully explore ways to establish new measures and better construct validity by way of gleaning primary data directly from managers who actually make decisions and implement competitive actions. For instance, recent research has explored the extent to which the influence of TMT demographics on both strategy and performance is mediated by group and decision-making processes, such as informal communication, decision debates, agreement-seeking behaviors, and the attainment of strategic consensus (e.g., Knight et al., 1999; Simons et al., 1999; Smith et al., 1994). Also, greater awareness of competitive challenges, for example, was also proxied with TMT characteristics, whereas other researchers have used cognitive schema approaches to explore the extent to which managers perceive challenges in the competitive environment (e.g., Reger & Palmer, 1996). Therefore, future researchers could use similar techniques to more directly measure the TMTs decision-making and cognitive processes and their links to competitive actions.

Given the definition of competitive action, the studies excluded the firm’s *internal* actions (such as using new information systems, reorganizing, or the shift to lean manufacturing, etc.). Nevertheless, some writers argue that competitive behavior is a function of the firm’s resource profile, whereby resources and actions may be two sides of the same coin (e.g., Grimm

& Smith, 1997; Wernerfelt, 1984). Future research could examine the link between internal actions and resources, competitive behavior, and external performance outcomes.

The vast majority of studies explore only the direct effects and linear relationships among the drivers and consequences of competitive action. Future research could possibly flesh out more moderated and curvilinear effects. For instance, Miller and Chen (1996) found a direct, linear relationship between competitive repertoire simplicity and performance. However, more recent research found that when firms carry out a simple competitive repertoire, those with heterogeneous TMTs actually experience better performance (Ferrier & Lyon, 1998). These authors reason that heterogeneous TMTs are better able to leverage their cognitive and experiential diversity to arrive at a simple, albeit effective repertoire of competitive actions. Also, several prior studies found linear relationships between the extent to which a firm's strategy is distinct from or deviates from other firms in the industry (e.g., Ferrier, 2000; Miller & Chen, 1995). However, other recent studies have explored the potential for curvilinear relationships between strategic conformity and performance. For instance, Deephouse (1999) found that the relationship between strategic heterogeneity exhibited a U-shaped relationship with performance. Similarly, Ferrier and Lee (2000) found that the extent to which a firm carries out a sequence of competitive moves that is different from that of a matched rival also exhibits a U-shaped relationship with performance.

### **TOWARD A NEW THEORY OF ACTION**

Our review of the competitive dynamics research reveals that scholars of competitive dynamics have closely aligned themselves to the all-knowing assumption consistent with early decision theory (Simon, 1955). Indeed, beyond the framing of papers based on Schumpeter and Austrian economics, most hypotheses are drawn from information theory or game theory.

Information theory provides completely rational explanations for competitive action: those who have the information will be most aware, motivated and capable of responding. Game theory is also based on the rational information processing capabilities of decision makers.

In this section we consider alternative theories of action that are based on different sets of assumptions. As such, we believe they may provide a broader and richer explanation of the actions and reactions than exists in the current research. In particular, to guide future research, we offer a preliminary set of propositions from institutional theory, evolutionary theory, organizational ecology, and network theory. Our goal is not to develop a new theory of action but instead to promote the development of more theory and research based on alternative assumptions about decision makers and their goals. The review is not exhaustive, but is meant to suggest new opportunities for theory building and testing.

Beginning with Simon's work (1955), there has been significant efforts revise theory to more adequately reflect the observation that organizational action is often disjointed, incomplete and less than optimal. For example, there is the argument that the selection of alternatives is not knowable and has to be discovered through action (Kirzner, 1973). Moreover, there is the contention that values that decision makers assign to outcomes will be variable, unstable and inconsistent across individuals (Simon, 1955; Weick, 1980).

Refined theory has emphasized action as rules and institutionalized behavior, action as routines formed through path historical dependencies and through environmental selection. In these more recent conceptualizations, the role of actors in selecting action alternatives is restricted by cognitive limitations and there are strong inertial pressures in organizations against change, despite the motives of decision makers.



## **Institutional Theory**

The principle of explaining actions based on rules and social considerations has a long history in sociology (see Weber, 1924, 1968). From this viewpoint, action is not the result of estimation of alternative choices to maximize some individual utility function, but is instead based on an attempt to gain legitimacy among peers and important constituencies. In other words, actions are selected based on social importance. Organizations do not simply respond to stimuli, they instead interpret the stimuli and then shape their actions in response (Weber, 1906-1924, 1946, 1924, 1947). Labeled institutional theory, this viewpoint argues that choice of action is based on requirements of socialization, institutional norms, and pressures to conform.

Scott defines institutions as “cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior” (1995: 33). Not coincidentally, the Austrians also claim that action is influenced by institutional forces (e.g., Koppl, & Langlois, 1994). For instance, Loasby (1994: 42) argues, “In studying the market process, we should pay particular attention to the effects of market institutions which emerge from the actions of those who participate in the market.” Indeed, from a competitive dynamics perspective, institutional pressures, conceived as regulative, normative and cognitive forces, may shape the firm’s actions in a number of ways. Regulatory forces include the pressure to make actions conform to formal rules, the evaluation of actions to be certain they conform to these rules, and the levying of sanctions in an attempt to maintain conformance. For example, an industry leader may directly engage a rival with price cutting actions in an attempt to regulate the rival for deviating from accepted industry behaviors. Or, a group of firms may work to influence government regulations in order to formally define industry operating standards as occurred in the U.S. domestic airline industry with regard to setting standards for on time arrival, baggage claims, etc.

Normative forces include the “prescriptive, evaluative and obligatory dimensions of social life” (Scott, 1995: 37). Norms define what types of actions are perceived as legitimate and acceptable to the larger industry group. From a competitive dynamics perspective, it is likely that every industry has its own unique norms of competition. These norms are established over time by the behavior of participants. These customs and norms may be observed in the consistency by which firms in an industry introduce new products (e.g., timing), how they test their new products in markets, and how they promote these products after they are introduced. Over time, these norms become entrenched and define what most industry participants view as acceptable competitive behavior. In some industries, acceptable competitive behavior may involve cutthroat price-cutting, in other industries price-cutting may be frowned upon. When firms violate the accepted norms of the industry, sanctions may result. Firms that conform to these norms will be seen as legitimate and supported, firms that deviate will fail to achieve support.

Cognitive forces also emphasize the extent to which belief systems and cultural forces are imposed on or adopted by individuals or organizations. The mechanism that is most prominent within the institutional literature is isomorphic process of imitation. From a competitive dynamics perspective, these cognitive forces would suggest that firms behave in consistent manner, in ways that will not cause them to stand out as a deviant.

These three forces are obviously interrelated and suggest some important competitive dynamic propositions:

*P 1. A firm’s decision on the type, time and place of actions will be the result of their attempts to obey rules of competition, conform to normative beliefs of what is acceptable, and behave in conventional way.*

*P2. Over time, the patterns of action and reaction in an industry will converge on a few institutionally accepted behaviors.*

*P3. Industry leaders will enforce normative types of actions by undertaking sanctions (reactions) against deviants.*

*P5. New, young firms will tend to deviate from normatively accepted actions because they will be less aware of customs and norms.*

*P6. The presence of industry associations or cooperative research groups will tend to regulate actions making firms more competitively homogeneous.*

*P7. Norms of competitive behavior will be clearer and more enforceable when there are cooperative research groups and industry associations.*

*P8. New industries will experience heterogeneity in competitive behavior.*

*P9. The greater the similarity of firms in an industry, the greater the likelihood of strong norms and regulatory pressures for conformance in types of action.*

## **Evolutionary Theory**

Evolutionary theory offers an alternative theoretical view that may explain the actions of firms. More specifically, evolutionary theory focuses on explaining how action, or sets of actions, change over time as a function of the dynamic change process (Nelson, 1995). For example, evolutionary theory could explain how and why a firm can change from being a laggard to a first mover, or change from being a weak competitor to that of a predator.

Evolutionary theory contends that a firm's action, or set of actions, is subject to random variation, but that there are also some mechanisms that systemically narrow the variation in firm action over time. Thus, evolutionary theory suggests that there are strong forces for inertia (for

old actions to be repeated and institutionalized), as well as processes that continually introduce new variation in action.

According to evolutionary theory, firms undertake action and learn from the results of action, which shapes future action. More specifically, new action is tentative because managers do not know the implications of their first moves or how to completely achieve the desired result (high profits). Initial new action then is preliminary and taken without commitment. As these new actions are undertaken, the manager learns about the effectiveness of these moves (actions that yielded high profits) and where actions need to be redesigned.

At the industry level and in early stages of industry development, there will be great variation in action among firms. When some actions become successful, rivals will attempt to imitate. The industry will gradually develop a structure in which only the firms that follow these actions or close variants thereof will survive.

Nelson (1995) argues that this learning process associated with action can be “modeled in terms of the change in the probability distribution of possible actions that an organization might take at any time, coming about as a result of feedback from what has been tried, and the consequences.” Nelson and Winter (1982) use the term “routines” to define behavior or actions that are taken without much explicit prior thinking. Such routines develop because they are deemed appropriate and effective in achieving desired outcomes. Routines develop through profit-oriented processes of learning (Nelson, 1995). Nelson describes three types of routine action. There are actions or routines that determine how much a firm produces – actions designed to exploit existing resource configurations at a given point in time (e.g., to set a certain price, or advertising campaign). Second, there are the actions designed to affect the configuration of resources as a function of its profits (e.g., an action to hire a new scientists, train

employees to improve their skills, or the action of building a new plant and equipment). Such action influences the configuration of resources. Finally, there are the deliberate actions of firms designed to search out new opportunities (e.g., these could be actions of introducing a new product, of entering a new market). Nelson notes that these search or entrepreneurial actions provide “differential fitness.” Indeed, some Austrians apply the theory of natural selection to the process of carrying out action in the marketplace (Kpoppl & Langlois, 1994). Drawing from Schumpeter, firms that undertake actions that turn up better products, markets, and resource combinations will earn profits and grow relative to their competitors. However, these search actions will also bind firms together as a community because they are partly based on what the competition is doing and other firms will imitate profitable actions.

Evolutionary theory suggests the following propositions:

*P10. A firm’s competitive actions over time reflect the habits and customs of the firm; in other words, actions will be repeated..*

*P11. Actions that exploit existing resource positions can be distinguished from actions that configure resources or search for opportunities.*

*P12. Exploitation of existing resources positions will be the most routinized (repeated) in terms of habits and customs.*

*P13. Search actions will involve innovation and new behaviors. Search actions that yield profits will be routinized and imitated.*

*P14. Profitable search actions will lead the firm to undertake new actions to reconfigure resource positions and hence new actions to exploit resource configurations.*

*P15. There will be an evolutionary progression to action: from search, to resource configuration, to exploitation.*

*P16. Prior actions (path dependencies) to exploit and configure resources will constrain future search actions.*

## **Organizational Ecology**

Organizational ecology is the study of organizational diversity. The focus of the theory is on the processes that influence variety (Singh & Lumsden, 1990). Although organizational ecology broadly examines the rates of organizational creation, demise, and change, our focus will be primarily on diversity in organizational action.

The principal argument of organizational ecology is that firms are subject to strong inertial pressures due to the processes by which they were founded and dissolved. A major assumption of ecology is that processes of birth, demise, and change in organizations parallels those in biology. As such, organizational ecology uses biological metaphors to predict diversity.

Consistent with organizational ecology researchers, we focus on how social and environmental conditions influence how new actions are created, why certain actions cease to be carried out, and why organizations change their actions. D'Aveni (1994) has proposed a life cycle to each action beginning with introduction, exploitation and escalating competitive reaction until a new action is required.

Concerning how new actions come about, organizational ecology suggests that as prior actions are given up, new resources will be released for investment in new action. For example, as a firm gives up a long-standing advertising campaign that was initially successful, funds will be released for a new campaign. However, a new type of advertising campaign will encourage rivals to imitate the same actions by signaling a fertile area. As the imitation process continues,

many new advertising actions will be created that it will increase the competition for advertising resources and further discouraging advertising actions. Thus, the ecology density argument suggests that the early types of new actions encourages and legitimizes further action of the same type (Singh & Lumsden 1990). However, as the density of a certain type of new action increases, the legitimizing process will be overcome by the competitive process leading to a decrease in the rate of new action.

Organizational ecology with regard to mortality is more complex. One particular theory concerns the liability of newness (Stinchcombe, 1965). When applied to action, the theory suggests that when firms undertake a *new* action, this new action will have to compete with existing proven actions in the marketplace. A firm that offers a new promotional campaign or a new product will have to contend with firms that already have existing campaigns or products in place. The fact that these other actions exist suggests that they already receive customer support. Managers will have to devote more attention and resources to new actions in order to effectively compete with existing firms that have loyal customers. Thus, the odds are stacked against new actions being successful relative to existing actions leading to the liability to action newness.

Related to the argument about newness, is the liability of smallness. As it pertains to action, we might think of some actions as large and involve significant commitments of resources, relative to actions that are minor in nature. Hannan and Freeman (1984) contend that the level of organizational inertia increases with size. Moreover, the action selection processes in the market favor those with greater inertia; those actions that do not change and are stable. Thus, we might imagine that small actions that carry less resource commitment will be less likely to succeed than actions that are larger requiring greater commitment.

The organizational ecology literature also addresses the change process. With regard to action, it suggests that actions with inert features, such as long term contracts, or actions that require significant commitments of physical capital, are more likely to survive in the long term and as they age, they become more inert. The implications are twofold. First, firms that deploy actions involving greater commitments of resources are less likely to change these actions if proven successful. And as these actions age, the likelihood of their being changed decreases (Singh & Lumsden 1990). Moreover, older firms are less likely to change actions than younger firms because they become embedded in their surrounding environment and develop relationships that limit their ability to be autonomous (Singh & Lumsden, 1990). Older firms will be more likely to repeat actions that have worked well in the past.

In summary, organizational ecology suggests the following propositions:

*P17. As the frequency of past actions is reduced, resources will become available for new action. The greater the resources available, the greater the likelihood of new action.*

*P18. New actions of a certain type will signal fertile ground leading to increased imitation of actions of that type by rivals.*

*P19. Increased imitation in action will eventually lead to increased competition resulting in a decline in further action of that type.*

*P20. New actions suffer from a liability of newness and will not receive the customer support of existing actions.*

*P21. Smaller actions or actions requiring a smaller commitment of resources will not receive the same level of support as will larger actions requiring more resources.*

*P22. Actions that require a greater commitment of resources will be more enduring and more difficult to change or stop than will actions requiring less resources.*



## Network Theory

Recent theory on organizations as networks also offers to advance our understanding of action and reaction. For example, network theory (Burt, 1982) and the embeddedness perspective (Baum & Dutton, 1996; Granovetter, 1985), suggests that firms and managers are not free to undertake any competitive action. Instead, such actors must operate within the constraints of the social networks they operate. Gulati (2000) contends that as networks become increasingly more important for firms, we must understand them if we are to fully understand their actions or behaviors.

For instance, using network theory, Gimeno and Jeong (2000) argue that a focal firm is more likely to form an alliance with a particular rival when that rival has a cooperative relationship with a third firm with which the potential attacker (focal firm) also has a cooperative relationship. Also, Gnyawali and Madhavan (2000) focus on *structural embeddedness* to develop a set of proposition that predict when and where firms will act and react. Gnyawali and Madhavan treat the firm network positions as *resource*, which the firm can draw upon to deploy its actions. They predict that the likelihood of action and reaction will be a function of four structural embeddedness properties: centrality, structural autonomy, structural equivalence, and density. They further argue that, “due to differential flow, control, and asymmetry of resources among members of the network, each structural property differently influences what firms know about others, what actions they are willing to undertake, and what they are capable of undertaking” (page 10). Consequently, the likelihood of a firm undertaking an action or response will be influenced by the structural properties. They conclude by arguing that the structural embeddedness perspective adds explicitly to our understanding of actions by

recognizing that actions decisions must be understood from the embedded network of interactions.

The Gnyawali and Madhavan (2000) paper is important because it develops new theory, which is not based on rational assumptions of managers, and because it offers a set of interesting propositions that can advance our understanding of firm action. Nonetheless, we believe that a network perspective can do more than predict when an action/reaction will occur. The following additional propositions are suggested by their theory:

*P23. Firms that are central in a network will be more likely to take first moves and be more likely to be aggressive reactors. Alternatively, firms that are non-central in a network will be laggards and slow reactors.*

*P25. Firms with strong network ties and those that compete across common markets will be less aggressive with action and reaction.*

*P26. When network structures of firms are similar, they will act and react more aggressively.*

*P27. Firms with high network centrality, have large networks of relationships, and firms that fill structural hole, will seek to set and enforce industry standards for competition.*

It is obvious that institutional theory, evolutionary theory, organizational ecology and network theory are interrelated and are thus simplified for purposes of this review. Nonetheless, in developing these new propositions, we hope to encourage more research on competitive dynamics that is based on new and different sets of assumptions of decision makers. We believe by employing alternative theories, with their accompanying sets of assumptions, a more complete and comprehensive understanding of action and reaction can be achieved.

## CONCLUSIONS

The distinguishing characteristics of competitive dynamics research include its focus on the real behaviors or actions of firms which are time- and place-specific, the emphasis on competitive interdependence, which recognizes that the success of a firm's action(s) is dependent upon the competitive context where it takes place, and its attempt to predict both the causes and performance and competitive consequences of action. The research that we have reviewed in this chapter reflects these unique attributes.

We have reviewed the theory, methods, and empirical findings carried out by competitive dynamic researchers. We conclude that the most progress has been achieved in terms of research methods and samples, yet more theoretical development is necessary if the value of competitive dynamics perspective is to be fully realized. In this regard, we have suggested a set of alternative theories, which are based on different sets of decision-making assumptions, and offer some preliminary propositions from each theoretical domain. Our ultimate goal is to inspire more conceptual work that could lead to future research.

Overall, we note that most aspects of the model outlined in Figure 1 have been tested. Moreover, these tests have been conducted in a good variety of industries and with large samples of firms. Some key findings from the research include the importance of action timing, action aggressiveness, and action repertoires (being different) for firm performance. However, there are also inconsistent relationships and contradictory findings across the samples and future research is necessary to sort out the discrepancies. It is unclear whether these inconsistencies are related to idiosyncratic nature of samples or the research method.

It is our contention that competitive dynamics research has great potential to advance our understanding of business level strategy and competition. We see this evolving along three

paths. First, study of actions and reactions can advance our understanding of rivalry, which is a fundamental aspect of all models of competitive advantage. For example, the level of rivalry or the ease with which firms act and duplicate advantages is a key variable in the resource based view of competitive advantage (Barney, 1991) and it is one of Porter's five forces affecting a firm's decision on industry positioning (Porter 1980). Yet, rarely have strategy researchers directly measured the extent of rivalry in testing different aspects of these models. However, by directly examining rivalrous actions of firms, competitive dynamic researchers can make more realistic and more accurate predictions on competitive behavior and its links to competitive advantage and performance. As such they can contribute to an improved theory of competitor analysis (Chen 1996; Porter, 1980).

Second, the competitive dynamics perspective can improve our understanding of the two key models of competitive advantage: the resource based view and the industrial organization viewpoints on strategy and advantage. Figure 2 captures *our* theorized relationship between resources, the environment or industry structure, and firm action. In this model we see action as the vehicle by which firms change resource configuration and industry positioning. For example, with the empirical study of firm action, researchers can examine how certain configurations of resources affect action and delay reaction (how different resources might be valuable), or how certain industry structural conditions, such as barriers to entry, affect the actions/reactions of firms (the level of rivalry). Moreover, researchers can also study how action impacts future (or changes in) resource configurations and future (or changes in) industry structure. In this regard, competitive dynamics research can inform and perhaps make these models of advantage more complete, dynamic, and valuable.

Finally, competitive dynamics research can improve our understanding of strategic choice and decision-making. Almost thirty years ago, John Child (1972) introduced the notion of strategic choice to distinguish the purposeful action of firms. Indeed, the concept of strategic choice stands as an *assumption* behind most strategic management research. Yet, researchers often must make inferences about the strategic decisions from coarse-grained annual reports or from retrospective reporting by executives. An organization's actions do not occur without some executive deciding to undertake a move. Thus the study of action connects the researcher more closely with strategic choice – the central concept of strategy. Moreover, the aggregation of actions according to patterns, routines, and sequences provides a literal definition of strategy (Andrews, 1980; Mintzberg and Waters, 1985).

We have covered a great deal of material in this chapter. Indeed, the extent of the review is perhaps suggestive of the progress of competitive dynamics research over the last decade. Yet, our review also has identified a number of important issues that must be resolved if competitive dynamics research is to fulfill its potential. We remain excited by the possibilities and optimistic for the future of competitive dynamics research.

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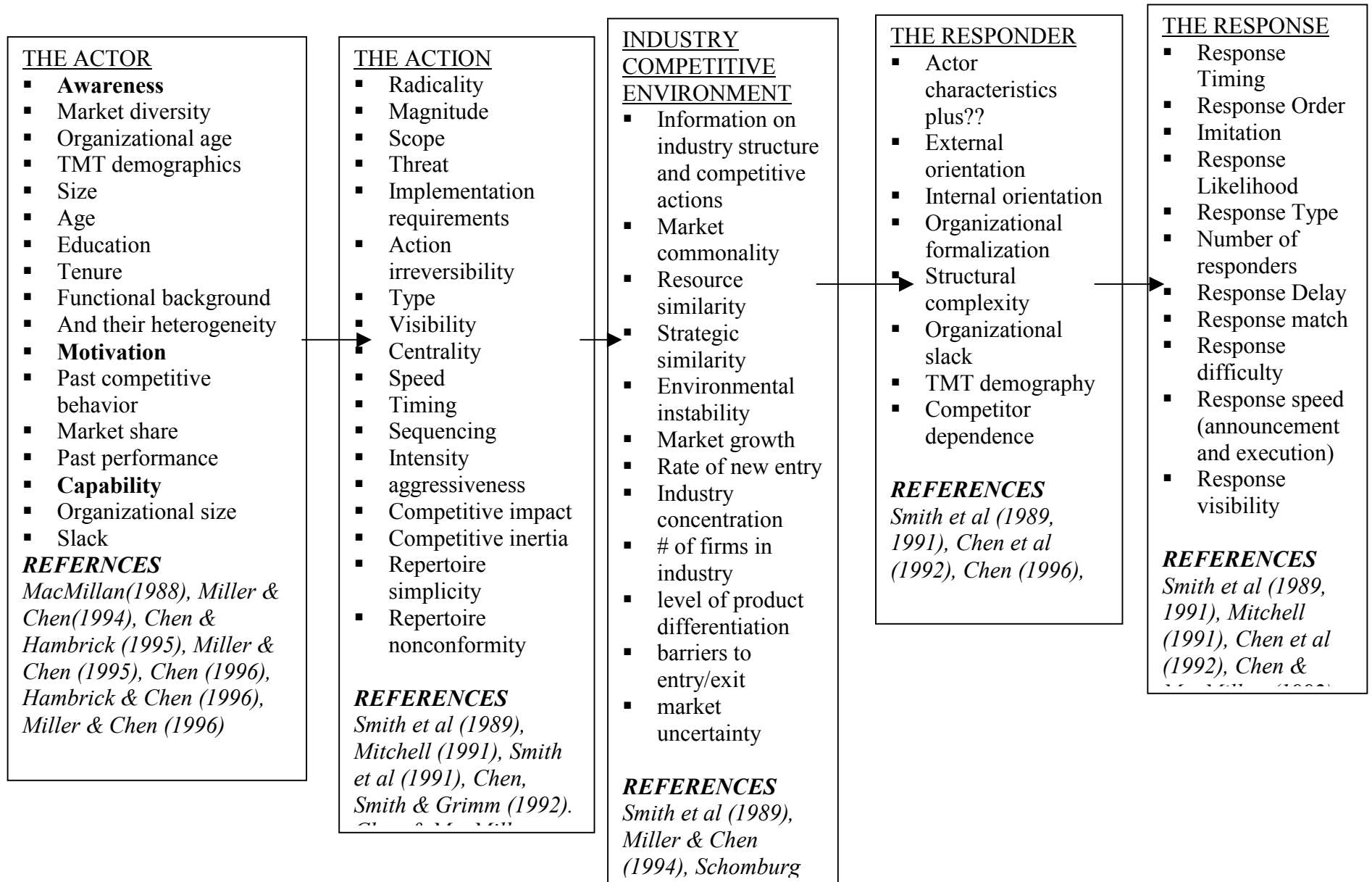


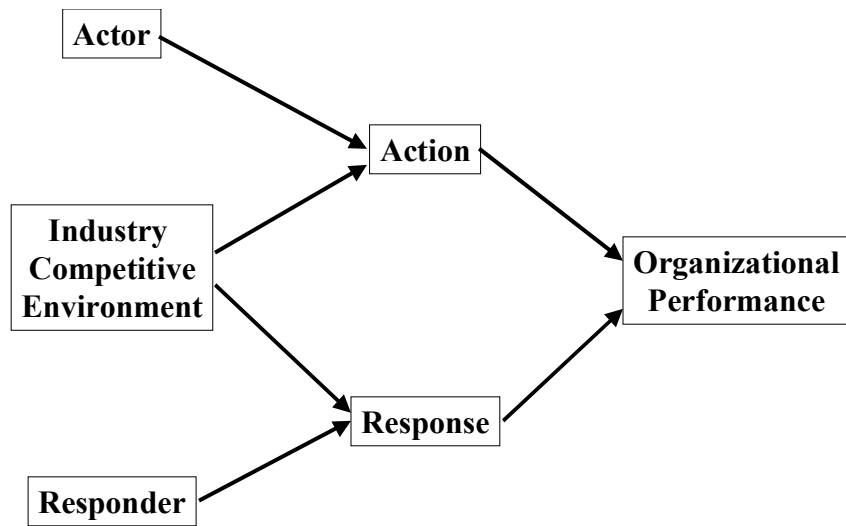
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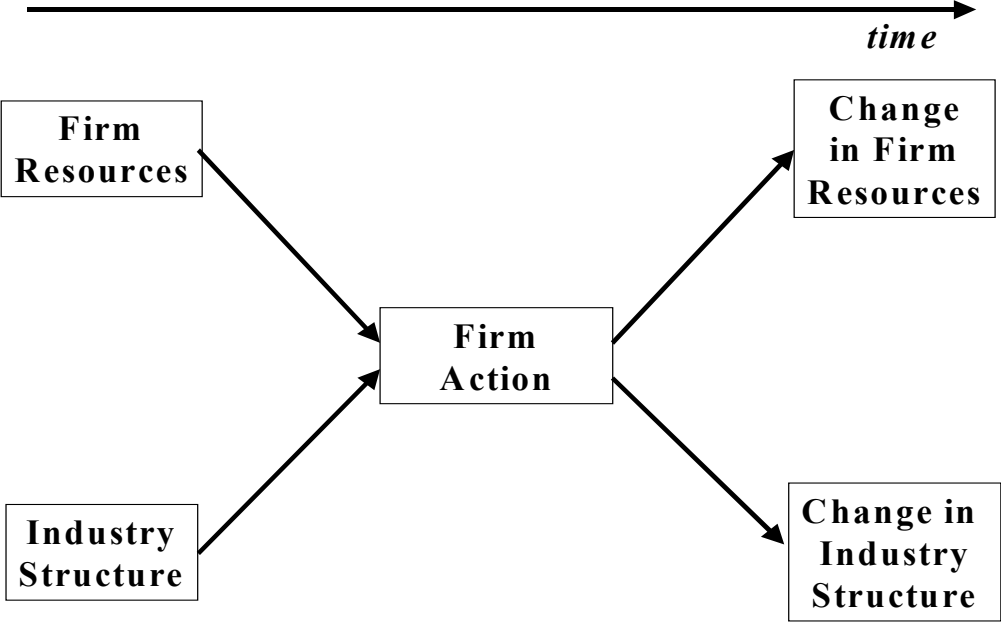
**FIGURE 1: The General Research Model**







**FIGURE 2: The relationship between resources, industry structure, and action over time.**



**Table 1: Conceptual and Operational Definitions of Action by Level of Analysis**

CONCEPTS STUDIED	OPERATIONAL DEFINITION	EMPIRICAL WORKS
<b>Action Characteristics:</b>	<b><i>Competitive Action:</i></b> <i>An externally directed, observable competitive move carried out to improve the firm's relative competitive position.</i>	
<i>Type, category</i>	General functional or operational category of a particular action; pricing, marketing, product, service, R&D, overt signals, etc.	Smith, Grimm, Gannon & Chen, 1991 Chen & MacMillan, 1992 Smith, Grimm & Gannon, 1992 Ferrier, 1997
<i>Magnitude, strategic type, strategic significance</i>	The extent to which a particular action reflects a significant investment or reconfiguration in fixed and/or human assets; actions significant departed from industry norms; strategic versus tactical	Chen, Smith & Grimm, 1992 Smith et al., 1992 Hambrick, Cho & Chen, 1996
<i>Threat, intensity, centrality</i>	The degree to which an action threatens specific markets/customers of a given competitor ; how strongly a given competitor is affected by an action.	Chen et al., 1992 Smith et al., 1992 Chen & Miller, 1994
<i>Scope (a), competitive impact</i>	The total number of competitors affected by an action.	Chen et al., 1992 Smith et al., 1992
<i>Radicality</i>	The extent to which an action significantly deviates from the industry norm.	Smith et al., 1992
<i>Implementation requirement</i>	The degree of effort required to execute an action in terms of resource allocations, interdepartmental coordination, coordination with external stakeholders, etc.	Chen et al., 1992 Smith et al., 1992
<i>Difficulty of response</i>	Perceptual attribute of a particular action that accounts for the estimated financial expense of making a responding move, the need for complex coordination, the allocation of staff and/or equipment, etc.	Chen & Miller, 1994
<i>Irreversibility</i>	The extent to which an action requires significant expenditures, legal and contractual relationships with other parties; requires significant interdepartmental coordination; disruption of systems and procedures	Chen & MacMillan, 1992
<i>Noteworthiness, visibility</i>	The amount of industry attention associated with a particular move; extent to which action are non-subtle, etc.	Chen & Hambrick, 1995 Hambrick et al., 1996
<i>Scope (b)</i>	The extent to which an action affects or requires the coordination among the full breadth of the firm's operations.	Hambrick et al., 1996
<i>Execution speed</i>	The amount of time required to implement an announced action.	Chen & Hambrick, 1995 Hambrick et al., 1996



**Table 1 (cont.): Conceptual and Operational Definitions of Action by Level of Analysis**

CONCEPTS STUDIED	OPERATIONAL DEFINITION	EMPIRICAL WORKS
<b>Response Characteristics:</b>	<b><i>Competitive Response:</i> An observable counter move carried out “in response to” or “in reaction to” an initiated action.</b>	
<i>Number of responses</i>	The total number of responses elicited by a given action.	Smith et al., 1991 Chen & MacMillan, 1992 Chen & Miller, 1994
<i>Imitation, matching response, tit-for-tat</i>	The degree to which a firm’s initiated action is imitated or matched in-kind by a rival’s competitive response.	Smith et al., 1991 Chen & MacMillan, 1992 Smith et al., 1992 Smith, Grimm, Wally & Young, 1997
<i>Lag, delay, speed, move timing</i>	The time elapsed between the focal firm’s initiated competitive action and a rival’s competitive response.	Smith et al., 1991 Chen & MacMillan, 1992 Smith et al., 1992 Smith et al., 1997 Lee, Smith, Grimm & Schomburg, 2000
<i>Order</i>	The firm’s chronological rank position (among all responders) in terms of carrying out a competitive response to a rival’s initiated action (i.e., 1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , etc.).	Smith et al., 1991 Smith et al., 1992 Lee et al., 2000
<i>Generation speed, announcement speed</i>	The amount of time elapsed between the announcement of a firm’s initiated action and the focal firm’s announcement of a competitive response.	Chen & Hambrick, 1995 Hambrick et al., 1996
<i>Execution speed</i>	The time elapsed between a firm’s announcement of its competitive response to an action and the day the response was implemented.	Chen & Hambrick, 1995 Hambrick et al., 1996
<i>Scope</i>	The extent to which a response affects or requires the coordination among the full breadth of the firm’s operations.	Hambrick et al., 1996

**Table 1 (cont.): Conceptual and Operational Definitions of Action by Level of Analysis**

CONCEPTS STUDIED	OPERATIONAL DEFINITION	EMPIRICAL WORKS
<b>Firm-year Aggregations, Repertoire Characteristics:</b>	<b><i>Action Repertoire: A coherent set of competitive actions carried out by a firm over the course of a year</i></b>	
<i>Action propensity, total activity, move frequency</i>	Total number of competitive actions carried out by a firm in a given year.	Chen & Hambrick, 1995 Hambrick et al., 1996 Young, Smith & Grimm, 1996 Smith et al., 1997 Ferrier, Smith & Grimm, 1999 Young, Smith, Grimm & Simon, in press
<i>Response propensity, responsiveness, likelihood, number of responses</i>	The extent to which a firm actually responded to initiated competitive actions, given the total number of initiated actions carried out.	Smith et al., 1991 Chen & MacMillan, 1992 Smith et al., 1992 Chen & Hambrick, 1995 Hambrick et al., 1996
<i>Rivalry instigation</i>	The number of first moves a firm carried out in a given year.	Smith et al., 1997
<i>Price cutting proclivity</i>	The proportion of pricing moves relative to total moves carried out by a firm in a given year.	Smith et al., 1997
<i>Repertoire inertia</i>	The number of market-oriented changes a company makes in the set of actions carried out in a given year to outmaneuver rivals in the marketplace.	Miller & Chen, 1994
<i>Repertoire non-conformity</i>	The extent to which a firm's entire set of competitive actions carried out in a given year deviates from the industry norm.	Miller & Chen, 1995
<i>Repertoire simplicity</i>	The extent to which a firm's set of competitive actions carried out in a given year consists of a narrow (versus broad) range of actions of different types or categories; the tendency to concentrate on fewer types of competitive actions.	Miller & Chen, 1996 Ferrier & Lyon, 1998 Ferrier et al., 1999
<i>Repertoire heterogeneity</i>	The extent to which a firm's set of competitive actions carried out in a given year deviates from rivals or the industry norm.	Ferrier et al., 1999
<i>Action timing, move timing</i>	The average time elapsed between a set of actions carried out by a firm and the set of actions carried out by a rival.	Ferrier et al., 1999 Young et al., in press

**Table 1 (cont.): Conceptual and Operational Definitions of Action by Level of Analysis**

CONCEPTS STUDIED	OPERATIONAL DEFINITION	EMPIRICAL WORKS
<b>Sequence Characteristics:</b>	<i><b>Action Sequence:</b> A coherent, uninterrupted, and ordered series of competitive moves carried out in time.</i>	
<i>Volume</i>	The number of actions that comprise given uninterrupted series of competitive action carried out by a firm.	Ferrier & Amburgey, 1998
<i>Duration</i>	The time elapsed from the first action to the last action in an uninterrupted series of competitive action carried out by a firm.	Ferrier, 2000
<i>Complexity</i>	The extent to which a given uninterrupted series of competitive action carried out by a firm is comprised of a wide (versus narrow) range of actions of different types.	Ferrier & Amburgey, 1998 Ferrier, 2000 Ferrier & Lee, 2000
<i>Heterogeneity</i>	The extent to which a given uninterrupted series of competitive action carried out by a firm deviates from that of a matched rival.	Ferrier, 2000 Ferrier & Lee, 2000
<i>Intensity</i>	The extent to which a firm's uninterrupted series of competitive actions consists of more and more actions within increasingly shorter timer periods; furious bursts of competitive activity versus sporadic activity.	Ferrier & Lee, 2000
<i>Unpredictability</i>	The extent to which a given uninterrupted series of competitive action carried out by a firm changes from one time period to the next.	Ferrier, 2000 Ferrier & Lee, 2000

**Table 2: Samples Of Competitive Dynamics Research.**

Industry	Time Frame	Kind and number of actions/reactions	Key (new) variables of interest.	Method
1. Banking industry	1980	Responses to banking innovations	Firm characteristics and characteristics of action.	Field/case study
2. Photography	1975-1980	Actions and responses	Stock market reactions	Case study
3. High Tech	1985-1986	47 actions and reactions of all types	action characteristics, response time, type, and firm performance	Field interviews and questionnaires
4. Computer Retailing	1988	25 competitive reactions	organizational resources,	Field interviews and questionnaires
5. U.S. Airlines	1978-1986	191 actions and 418 responses	response order, number of responders	Archival study of Aviation Daily
6 Brewing, telecommunications, & personal computers	1975-1990	82 new product introductions & 632 imitative responses	Industry structure & performance, stock market reactions	Archival study of F&S Predicast—700 newspapers and business magazines, trade associations.
7 Software	1980-1990	2347 actions and reactions	Competition, cooperation & performance	Archival study of F&S Predicast
8. Leader/challenger pairs-41 different industries	1986-1993	4876 actions and reactions	Action repertoires, industry dethronement	Archival study of F&S Predicast.