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Competitive Interaction: The Influence of Strategic Group Structure

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ABSTRACT

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The assertion that competitive interaction is a central focus of business strategy emerged from the Strategic Management Research Group (SMRG) at the University of Maryland. The premise of this perspective is that competition among firms can be modeled using communication theory to explain how firms in an industry interact. Competition, in this framework, is represented as the series of actions and counteractions, termed responses, that firms undertake to position themselves in their industry. Thus, in this model, interaction (actions and responses) equates with competition. Studies conducted by the members of the SMRG have outlined the relationship of key variables within the Communication-Information Processing Model of Competitive Interaction (CIP) to measures of performance, a key outcome variable in strategic management research.

A factor that is hypothesized to influence the response variables within the model is homophily--a concept which refers to the similarity of characteristics between sender (the actor) and the receiver (the responder). The proposed relationship between homophily and response however, has been minimally explored. This study investigated the relationship between homophily and response through the development and presentation a thesis that the strategic group concept of firms within an industry (Hunt, 1972) can be used as a proxy for

the homophily construct. This study investigated the influence that strategic groups in an industry may have on the variables representing the competitive behavior of firms in that industry, as captured by the Communication-Information Processing Model of Competitive Interaction.

The intersections between the strategic group literature base and the emerging theoretical and empirical literature of the Communication-Information Processing Model of Competitive Interaction were presented and discussed. From this discussion, testable hypotheses were developed in order to extend the theory by explaining how the strategic group concept is associated with key variables of the CIP model. The tests of the hypotheses regarding the influence of the strategic group construct on components of the Communication-Information Processing Model of Competitive Interaction reveal that there is a relationship between the similarity of strategic group membership of the actor and responder and certain response characteristics central to the CIP model.

Dedication Page

This dissertation is dedicated to my husband, James D. Kent for his love and steadfast support through good times and bad; and to my grandmother, Marie Odette Ghisolfi who embodied perserverance through adversity and whose motto "Quand on veut, on peut" provides enduring guidance.

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CHAPTER 1

INTRODUCTION

Competition--in the sense of organizations jockeying for resources, customers, markets and profits--is central to the discourse of business-related fields of inquiry, such as economics, marketing and strategic management. The field of strategic management has long been interested in competition among firms in an industry. Indeed, much of the theoretical underpinnings of the field suggest that firms select a domain in which to compete--i.e., choose a corporate-level strategy--and then pursue means through which to compete in the chosen domain--i.e., choose a business-level strategy (Hofer & Schendel, 1978; Bourgeois, 1980). The process of implementing and pursuing a business-level strategy gives rise to competition in the industry as each firm moves to secure resources and markets (Henderson, 1983), as well as to exploit opportunities and minimize threats (Spender, 1985).

Embedded in the search for competitive advantage, competitive interaction among firms in an industry is a fundamental, though generally implicit, element of strategic management. As a firm moves to pursue competitive advantage anticipated from its business-level strategy, so do others in the industry. This pursuit of competitive advantage results in competitive

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interaction, or rivalry, as firms attempt to enhance their competitive position in relation to each other *vis a vis* resources, capabilities, customers and revenues. Barney (1991) implies that firms can compete away the gains of competitive advantages that are not based on unique and inimitable resources. Rivals can take *action* to *copy* perceived advantages. The focus on competition in strategy research is readily apparent in articles concerning the pursuit and sustainability of a competitive advantage (Barney, 1991; Peteraf, 1993a; Porter, 1985;).

Despite the suggested importance of competitive interaction--rivalry--to the field, few studies have directly focused on the nature of interaction among firms in an industry (Bettis & Weeks, 1987; Chen, 1988; Smith, Grimm & Gannon, 1992; Peteraf, 1993, 1997). In answer to the call made by Caves (1984) to investigate the rivalrous moves among incumbent producers in an industry, this study investigates competitive interaction in a specific focal industry. This is accomplished through the application of the Communication-Information Processing (CIP) Model of Competitive Interaction.

The CIP model is based on communication-information processing theory. The model, developed by Smith and Grimm (1991), elaborated by Smith, Grimm, Gannon and Chen (1991) and applied primarily to large scale research in the U.S. airline industry (Smith, Grimm & Gannon, 1992; Chen, et al., 1992; 1994, 1995,) draws a parallel between the communication process (sender-message-receiver) and competitive interaction (acting firm-action-responding firms). The model and its ancillary propositions are currently under-tested. Large-scale

empirical tests have been conducted primarily in only one industry. This study serves to extend the generalizability of the model to a different industrial sector.

A facet of the CIP model that is currently underdeveloped is the influence of homophily--the degree of similarity--on key variables within the model. The degree of homophily between firms is a characteristic influenced by industry structure. Industry structure is one dimension of the competitive environment facing firms (Smith, Grimm & Gannon, 1992). The facet of industry structure that is the focus of this study is the level of homogeneity among firms in a focal industry (Aldrich, 1979; Cool & Schendel, 1988). This study investigates the influence of industry structure within the context of assessing competitive interaction in an industry by specifically assessing a firm's placement within the industry structure. The strategic group construct (Bogner & Thomas, 1994; McGee & Thomas, 1986; Porter, 1980) a construct within the industry structure paradigm of Industrial-Organization Economics and Strategic Management, captures the dimension of the competitive environment represented by homogeneity. Groups represent the structure of the industry and firms are positioned within a specific group (McGee & Thomas, 1986). The strategic groups in an industry are comprised of firms that are *homogeneous* along several product/market and resource attributes. This homogeneity begets homophily. Homophily, defined as a similarity among entities in a system, has been identified as both facilitating and inhibiting communication (Smith & Grimm, 1991).

The strategic group construct will be applied to the CIP model to determine the construct's influence on competitive interaction. Feigenbaum,

McGee and Thomas (1986) propose that studies of strategic groups can contribute to an understanding of the strategic behavior of firms. The strategic group construct represents the structure of the competitive environment in which firms operate, and has had a central role in theory development and empirical inquiry in the Strategic Management field (Day, Lewin, & Hongyu, 1995; Peteraf & Shanley, 1997; Reger & Huff, 1993). Firms within groups share a similarity of assumptions about the potential of the industry (Porter, 1980). Firms in a group also have a similarity of goals and the skills/resources to achieve those goals (Caves & Porter, 1977). Strategic groups are relevant to the line of inquiry presented in this study as they are proposed in the literature to affect managers' information search behaviors and the decision-making process used in strategy formulation and implementation (Harrigan, 1985; Porac & Thomas, 1990). A firm's membership in a particular strategic group, therefore, should be a firm-level characteristic that should influence competitive interaction (Peteraf & Shanley, 1997). As will be discussed in the review of literature, the strategic group construct is just beginning to be applied to questions of firm-level conduct and behavior (Feigenbaum & Thomas, 1993, 1994; Bogner, Pandian, & Thomas, 1994, Peteraf & Shanley 1997). In this study, the strategic group construct is expected to have some degree of influence on the competitive behavior of firms as captured by the CIP model.

Through the application of the theory of the CIP model of competitive interaction and the methodology developed by Chen (1988) to operationalize its constructs, several questions regarding the influence of the strategic group on

competitive behavior are addressed. These questions are related to the nature of competition within and between groups, focusing on how firms in strategic groups interact. This type of inquiry is lacking in strategic group research (Baum & Korn, 1996). The research questions pursued in this study are: (1) do firms within strategic groups interact more intensively with each other or with firms from other groups; (2) does group membership affect the time it takes for firms to respond to a competitive move made by a firm in the industry; (3) does group membership influence whether a firm imitates a competitive move; (4) within the groups, can a hierarchical order of respondents be identified (i.e., is one firm in a group predominately "first" in formulating responses consistently followed by a sequence of other responding firms).

Through the pursuit of these questions this study makes several contributions to the emerging literature which investigates the CIP model. In addition to joining those few who have responded to the call made by Caves (1984) to investigate rivalrous moves (Chen, 1988; Peteraf, 1993b), this study responds to the challenge issued by Smith et al. (1992) and by Chen and Hambrick (1995) to extend the application of the research inspired by the CIP model of competition into other industrial sectors. Additionally, investigation of the influence of strategic groups on competitive interaction behaviors serves to probe the role that similarity between the actor and responder is expected to have in the CIP model. This is an aspect of the CIP model which has not been significantly addressed in previous research.

The purpose of the current study, then, is to: (1) extend the application of the CIP model of competitive interaction to a different industrial domain from which it has been applied and subsequent theory developed, and (2) ascertain if strategic groups, as a proxy for homophily, influence components of the CIP model that can be characterized as manifestations of competitive behavior.

The remaining chapters proceed as follows. Chapter 2 presents the model of competitive interaction and its development from communication theory, a summary of the empirical research on the CIP model, and a discussion of the strategic group literature. Chapter 3 presents the intersection of the Communication-Information Processing Model of Competitive Interaction with the theory base of the strategic groups literature. This intersection provides the basis of theory development for the hypotheses regarding the role of strategic groups in competitive interaction in an industry and the relationships that are expected to be observed among strategic groups in an industry. The methodology of the study is presented in Chapter 4. In Chapter 5 the results of the study are presented and these results are discussed in Chapter 6.

CHAPTER 2

LITERATURE REVIEW

This study draws upon the literature of two research streams within Strategic Management: the Communication-Information Processing (CIP) Model of Competitive Interaction and Strategic Group Theory. The CIP model of competitive interaction draws on the theory base of communication and information processing within organizations, strategic issues management, and environmental scanning. It views competition as an analogue of the communication process--a non-verbal signal sent to receivers (other firms in the industry) by means of a competitive action. A competitive action by a firm can take many forms, but the purpose is generally to secure resources, improve capabilities and/or acquire market share. The action can be implemented through such means a price increase, merger, expansion, long-term supply contract, or new product development. Competitive actions are an implicit component of strategy implementation. For example, in each of the business-level strategies identified by Porter--differentiation, cost leadership, or niche focus--it is expected that actions must be taken to implement the firm's chosen strategy. Research regarding the CIP model and its application is comparatively new within Strategic Management research (Smith, Grimm & Gannon, 1992).

In contrast, Strategic Group Theory (SGT)--the concept that there exists in each industry groupings of firms in that follows similar strategic patterns and

positions (Bogner & Thomas, 1993; Cool & Dierickx, 1993)--is a mainstay within Strategic Management research. The strategic group is thought to have some influence on the conduct of firms in an industry and, hence, on performance. While this construct has been presented as framing a context for competition, there has been scant empirical investigation of its influence on competitive interaction (Peteraf, 1993b; Baum & Korn, 1996). The intersection of the CIP model of competitive interaction and Strategic Group Theory of the Strategic Management research base provides a fertile test-bed to further test the CIP model. Specifically, does the existence of strategic groups influence competitive interaction, as captured by the CIP model, in an industry? Although this may appear to be intuitively simplistic, the empirical research on strategic groups is unclear as to their influence on competitive interaction in an industry.

The next section presents the CIP model of competitive interaction and the supporting literature. The section following presents the relevant strategic group literature.

THE COMMUNICATION-INFORMATION PROCESSING MODEL OF COMPETITIVE INTERACTION

This section presents and discusses the background and theoretical development of the CIP model of competitive interaction, the terms and constructs associated with it, and the empirical studies contributing to the model's development.

Background and Development of the CIP Model

The CIP model of competitive interaction, based on communication-information theory, was developed by Smith and Grimm (1991) and applied in empirical research, primarily in the U.S. airline industry, by Chen (1988), Smith, et. al (1989, 1991, 1992) and Chen and colleagues (1991, 1992, 1994, 1995). The core of the model is derived from the observed parallels of the communication-information process between sender and receiver and the competition process between firms (Smith, Grimm & Gannon, 1992). Since the model is drawn from communication-information processing theory, the model applies a communications perspective to explain and predict the behaviors evident in competitive interaction among firms in an industry.

The CIP model of competitive interaction was developed by the *Strategic Management Research Group* (SMRG) at the University of Maryland, consisting of Frank Paine, Martin Gannon, Ken Smith, and Curtis Grimm and their doctoral students. These researchers were attempting to identify a more dynamic conceptualization of strategy within the Strategic Management field. From their deliberations they realized that the use and application of information underlies the paradigm of the Strategic Management research base (Smith, Grimm,

Gannon & Chen, 1991; Smith, Grimm & Gannon, 1992). For example, to be a cost leader the firm needs information on its costs, as well as information on its competitors' costs. To follow a niche strategy, the firm needs information on the current niches or the niches that can be created within an industry. It also needs information regarding competitors' intentions regarding these segments.

The concept of information as relevant to Strategic Management is not new (see, for example, Porter, 1980). The SMRG, however, went beyond the Porterian application of information, to specifically demonstrate that the competitive process, a manifestation of a firm's strategy, could be modeled by the communication-information process. While the role of information is not new to organization science, as is demonstrated and discussed in the next section, the application of a communication model to capture the dynamics of the competitive process between firms in an industry was a contribution that the SMRG made to the field.

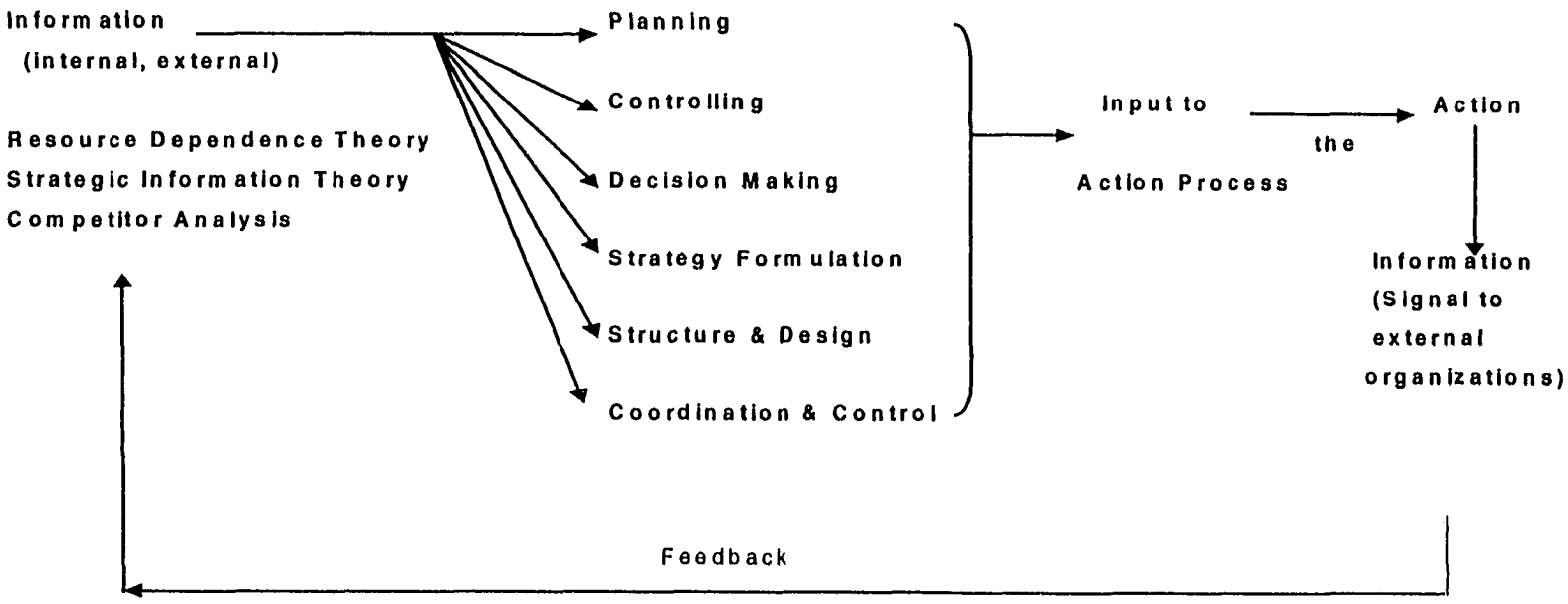
Information in Organizational Science--Rationale for the CI Model

The existence of a communication-information processing perspective has held central focus in organization science. Information is a necessary input to internal functions of the firm (Daft & Weick, 1984) such as planning and controlling (Bateman & Zeithamel, 1996), decision making (Schwenk, 1984), strategy formulation and implementation (Fahey & Narayanan, 1986), and organization structure and design, as well as coordination and control (Galbraith, 1973). Information is also relevant to the external relationships that the firm has with other entities in its environment (Porter, 1980).

Several theories regarding how firms manage their relationship with their environment implicitly suggest the central importance of information. Resource Dependence Theory (Pfeffer & Salancik, 1978), for example, focuses on the relevance of information regarding external entities that play a role in the flow of resources to the firm, and how this information influences how a firm chooses to interact with these entities. Strategic Information Theory (Dutton & Jackson,1987) relies on the information content of issues occurring in the firm's environment, and how this information can affect the firm, either positively (i.e., opportunity) or negatively (i.e., threat). Competitor analysis (Porter, 1980; 1985) also emphasizes the importance of information regarding competitors as a component of the strategy formulation process

In viewing the organization or firm as an information processing system (Daft & Weick, 1984), it is implied that the organization is comprised of structures and personnel which receive information regarding internal processes and external conditions and issues (Galbraith, 1973), interpret information, make conclusions as to the potential effect on the firm (Dutton & Jackson, 1987), and use information in decision-making processes regarding the firm's alignment with its environment (Lawrence & Lorsch, 1967; Powell, 1992). The use of information in this manner may result in actions implemented by the firm intended to alter the organization's alignment with its environment. Figure 1 depicts the relationship between information, internal decision processes, and actions taken by the firm. Some actions are specifically targeted to exploit a firm's competitive

Figure 1
Relationship of Information, Internal Processes and Actions



advantage and augment its position relative to other firms in the industry (Peteraf, 1993a; Baum & Korn,1996). Both internal and external information have the potential to result in competitive actions through decision-making, strategy formulation and implementation, and organization structure and design. The resulting actions carry information to external entities (e.g., customers, investors and competing firms) which, in turn, use the information to provide data to their information-dependent organizational processes to formulate and implement a response (Smith & Grimm, 1992). For example, if the firm's actions signal to a customer a price increase, the customer may attempt to negotiate a long-term supply contract to lock in favorable terms. Investors may bid up or discount a firm's share value based on the "news" carried in the firm's action. A competitor may take a counter-action to nullify the advantage the acting firm was seeking from the action (Peteraf, 1993a).

From the perspective of the CIP model, competition, which is also termed *competitive interaction* in this literature base, is viewed as a dynamic information exchange process which can be depicted as given in Figure 2:

Figure 2
Competition: A Dynamic Information Exchange Process

The competitive behaviors of the actors and responders of the process depicted in Figure 2 are influenced by factors that affect information exchange, such as,

noise, structure and homophily (Smith, Grimm & Gannon, 1989; Smith & Grimm, 1992). As a dynamic information exchange process, competition is a series of interactions motivated by the information content carried in a particular action, and the assessment of that information by the decision makers of the firms that have the potential to respond to the action (Smith, Grimm, Gannon & Chen, 1989; Smith & Grimm, 1992).

Competitive Interaction and the CIP Model

Interactions among firms have been characterized as being either cooperative or competitive in nature (Nohria & Garcia-Pont, 1991). The scope of the research stimulated by the CIP model focuses on competitive interactions: firms competing with other firms, through actions or responses to actions, in a specified domain for growth or survival (Smith, Grimm & Gannon, 1992). In this stream of research competitive interaction is defined as a dynamic process by which industry participants compete with each other through the undertaking of a series of competitive actions and responses to actions (Porter, 1980; Chen, 1989). The stream of research stemming from the CIP model uses as its level of analysis the competitive actions made by firms and the counteractions made in response to actions (Smith & Grimm, 1992; Baum & Korn, 1996). The action is viewed as the message being sent to receivers--other firms in the industry. An action taken by a firm, and the response it triggers, are defined as a competitive event which constitutes an interaction among firms.

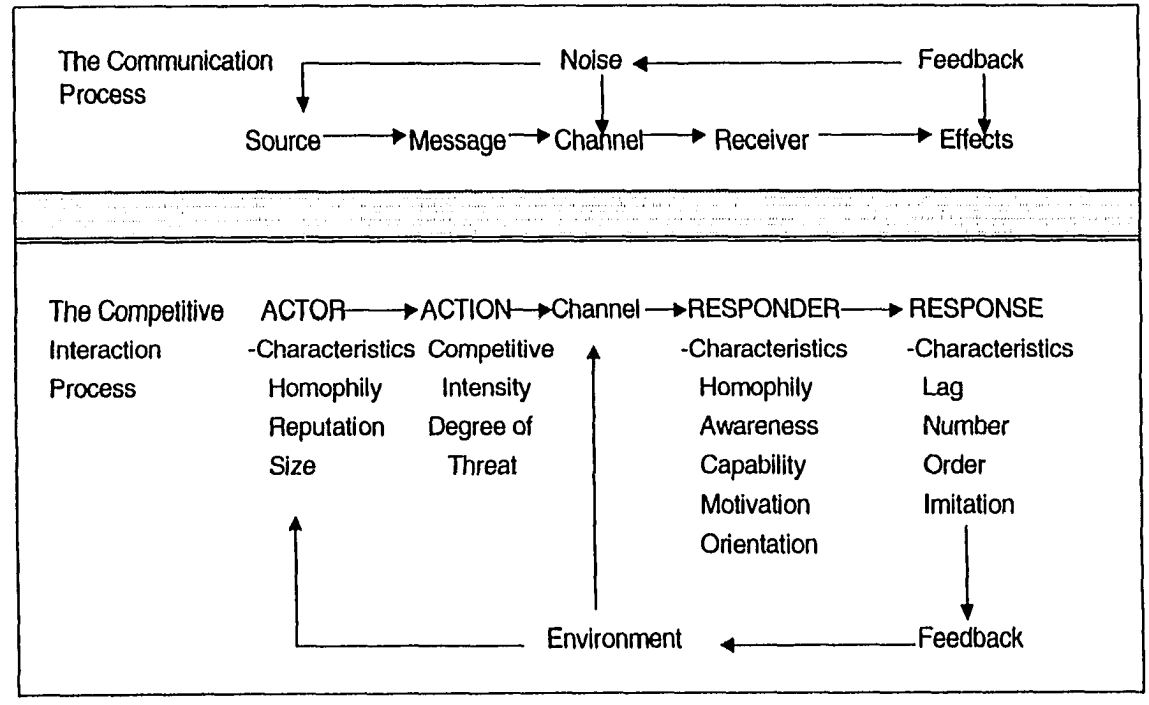
The similarities between the communication-information process and the competitive interaction process form the core of the CIP model and are displayed

in Figure 3. In the model competition is viewed as a form of communication between parties. Smith and Grimm (1991) identify the basic components of the CIP model as the actor and the characteristics of the actor; the action and characteristics of the action; the responder and the characteristics of the responder; a communication channel connecting the actor and the responder; and, the competitive environment. The competitive environment introduces other information and noise into the system. Part of the information carried by the competitive environment is information on the structure of the industry (Smith & Grimm, 1992). This model has been applied primarily in empirical research on the U.S. airline industry.

According to the CIP model, information regarding competitive intent is communicated by the actions of firms in the industry and the response made to those actions. As can be seen in Figure 3, the action is viewed as the message, or signal, sent to receivers--other competitors in the industry. The "actor" is the source and sends a "message" to other firms via an "action." The "action" conveys information to other firms. The "receivers" are other firms in the industry and are potential "responders" to the message contained in the action. The message carries information content as to the intent of the acting firm *vis a vis* other firms in the industry, the degree of threat to the receiving firm(s), and the area of competitive focus of this action-specific aspect of the firm's business-level strategy.

The "message" content of an action must pass through the "receiver's" sense-making process (Smith, Grimm & Gannon, 1992; Daft & Weick, 1984). In

Figure 3
The Communication-Information Processing Model of Competitive Interactions
(Smith, Grimm, and Gannon, 1992)



general terms, this process has been described in the literature as being performed by the upper echelon of an organization (Hambrick & Mason, 1984). The upper echelon is considered in practice and in the literature as monitoring the environment (Hambrick & Mason, 1984; Daft, Sormunnen & Parks, 1989; Boyd & Fulk, 1995) and undertaking strategic decision making (Eisenhardt, 1989; Bourgeois & Eisenhardt, 1988). The "receiver's" decision makers assess the information content of the action. The "signal" from the acting firm, however, may not always be received by other firms.

Failure to receive the message occurs due either to noise in the system or lack of awareness of the action (Smith, Grimm, & Gannon, 1992; Chen &, MacMillan, 1992). Just as in the communication process, if a message is not received, a response cannot be formulated. The model indicates that the responder must have a level of "awareness" of the action for the message to be received. Thus, a lack of awareness of an action is a determinant of non-response to an action (Chen & MacMillan. 1992).

If a competing firm does receive the message, the sense-making process requires that the actor and action characteristics be assessed for information content. The receiving firm's decision makers assess the message for the impact on the firm. The information content regarding: (1) who the actor is; (2) how the action alters the advantage of the acting firm, and (3) how the action affects the competitive advantage of the receiving firm is assessed. These potential effects are then considered in the upper echelon's decision-making process (Henderson & Nutt, 1983) and a decision is made to act upon the information conveyed in the

action, or not. The "response" of the "responder" is further determined by the firm's motivation to respond and the firm's capability to respond (Chen & MacMillan, 1992).

If a response is made by a firm, the model identifies certain response characteristics. These response characteristics are also affected by motivation and capability (Chen & Miller, 1994). If a firm has the motivation to respond, but does not have the capability, the firm may not be able to respond. If it does respond, the time elapsed between the action and the response, termed response lag, will be longer than if the capabilities were in place. For example, a price cut by firm A may be viewed as a threat and an attempt by the actor to increase market share. Firms B and C are both aware and motivated to respond to preempt the action. Firm B assesses that it has the capability to sustain a price war and responds almost immediately. Firm C, however, lacks the capability and its response is delayed.

Terms and Definition of Constructs of the CIP Model

With the concepts of the CIP model presented, a summary of the terms and concepts of the model is in order. These terms and concepts are relevant to the dependent and independent variables that are presented in the hypotheses developed in Chapter 3 and the methodology presented in Chapter 4.

Actions and Actors. An action is defined as a specific and detectable competitive move. Actions convey messages regarding intent (e.g., acts to extend market share, alter capabilities, or change source of competitive advantage). Actors are those firms in the industry that undertake an action.

Response and Responders. A response is a countermove, or counteraction, made to a specific action by a specific actor. The responder is the firm undertaking a countermove or counteraction.

Actor and Responder Characteristics. These are characteristics of the firm that acts or responds to an action. The organizational characteristics of both the actor, such as size and reputation, and responder, such as strategic orientation and organizational slack, have been found to influence the response characteristics exhibited.

In viewing competitive interaction as a communication process, the characteristics of the actor and the characteristics of the action carry information content that must be interpreted by the receiver as it interprets the action and formulates the decision to respond (Smith, Grimm & Gannon, 1992). Both actor characteristics and responder characteristics were found to be determinants of response characteristics (Chen & MacMillan, 1992).

Response characteristics. There are several key dimensions to the response construct that have been analyzed in competitive interaction research. These are taken to reveal the response dynamics elicited by the characteristics of the actor, action, and responder. These key dimensions are:

Response lag - the delay between action and response.

Response likelihood - the ratio of responses made by a firm out of the number of opportunities a firm had to respond.

Number of responders - the total number of firms that actually respond to an action.

Response order- rank position based on response lag.

Response imitation - the degree to which the response imitates the action.

The response characteristics and the actor/responder characteristics are the focus of the present study and are applicable to the research questions addressed in the present study. Their operationalization and measurement will be discussed separately in the methodology chapter.

Studies based on the CIP Model

The competitive interaction stream of research resulting from the application of the CIP model is a comparatively new area of research in the Strategic Management literature. As a result of its relative newness, there have been a modest number of empirical studies based on the CIP model. One of the earliest was a small-scale study based on interviews with top-level managers from high-tech industry firms (Smith, Grimm, & Gannon, 1990). However, the majority of the research articles published in this field are based on the empirical data in the U.S. airline industry which served as the basis for the pioneering dissertation by Chen (1988) on the CIP model.

In a study of high-tech electronics firms (Smith, Grimm, Chen and Gannon, 1989), the focus was on the response characteristic of response time, also referred to in this research as response lag. Organizational characteristics of the responder (i.e., responder characteristics) were tested for their association with response time. Some action characteristics were also tested for their association with response time. Response time, in turn, was tested for its association with organizational performance, as measured by sales growth.

The responder characteristics indentified and tested for their relationship to response time were degree of formalization and strategic orientation (i.e., internal/external orientation as conceptualized by Miles and Snow, 1978). Degree of formalization, the extent to which an orgnization's behavior is governed by rules and procedures, was not significantly correlated with response time. In assessing the firm's overall strategic orientation and the association with response time, the study found that the more externally oriented a firm, the lower the response time to an action. Conversely, the more internally oriented a firm, the higher its response time.

The action characteristics assessed in the study were the degree of perceived threat of the action and the perceived radicality of the action. The former was negatively associated with response time—the greater the threat, the lower the reponse time. The latter was positively asociated with response time; however, 'radicality' was poorly operationalized and measured in this study. The results also indicated support for the hypothesis that response time was negatively correlated with organizational performance.

In summation, the small-scale study of high-tech electronics firms tested the responder characteristics and action characteristics components of the CIP model for their influence on response time, as well as the relationship between response time and performance.

A series of research publications stemmed from Chen's (1988) dissertation. The first study, Smith, Grimm, & Chen (1989) concentrated on action characeristics as predictors of response lag. This study was focused on

how competitors interact in the marketplace via the ongoing exchange of competitive moves, with an emphasis on the action characteristics. The action characteristics associated with response lag were: (1) competitive impact; (2) attack intensity; (3) implementation requirement; and (4) type of action, whether strategic or tactical (It is interesting to note that of the 191 actions identified, 83% were tactical, such as price cuts). Each of the characteristics were were found to be salient predictors of response lag. From the findings regarding competitive impact and attack intensity, the authors drew the conclusion that the degree of threat represented in an action provided motivation to respond to an action. The authors further concluded that the study suggested that the awareness, motivation and capability of a potential responder determines its likelihood of responding.

The second study published from the empirical research on the CIP model in the U.S. airline industry focused on nonresponse and delayed response to actions (Chen & MacMillan, 1992). This research focused on two variables representing responder and action characteristics and the association with nonresponse or delayed response. The responder characteristic variable was defined as competitor dependence: the extent to which a competitor relies on the markets affected by an action. The action characteristic studied was the irreversibility of the competitive move. This was assessed through the application of a questionnaire mailed to 430 senior airline executives. The results of the analyses indicated that the greater the competitor dependence a responder has with an actor, the lower the likelihood of non-response, while the

greater the action irreversibility, the higher the likelihood of non-response. The study also demonstrated, contrary to the prediction of the hypothesis, that competitor dependence was positively related to response delay—the greater the dependence, the greater the response delay. In their conclusion, these authors posit lack of awareness as a possible determinant of non-response to an action.

The third study in this research stream relates action characeristics to response characteristics (Chen & Miller, 1994). The visibility of an action, and the centrality of the attack were positively associated with the number of responders answering a competitive action. The visibility of an attack operationalized the awareness construct of the CIP model. It was positively associated with the number of responses elicited by an action. The centrality of an attack captured the effect that a threatening action is expected to have in competitive interaction--threatening actions provoke response. In this study, the centrality of an attack was defined in the same way as competitor dependence in the previous study.

The fourth study in the research stream began to compare how categories of firms differ in their competitive behavior. Remaining within the domain of the U.S. airline industry, Chen and Hambrick (1995) compared the competitive behaviors of large and small firms observable through application of the CIP model. Small airlines were found to have greater propensity for action than the large firms in the study, faster action execution speed, and less action visibility. However, small firms were less responsive to competitive attacks and responded more slowly to actions than larger firms. In short, the study conducted by Chen

and Hambrick examined how the competitive behaviors of small firms differed from larger firms.

In addition to refining the determinants and predictors of response characteristics, the studies conducted by Chen and colleagues conclude that awareness (of the action), motivation, and capability are attributes of the responder that influence response characteristics (Chen & MacMillan, 1992, Chen & Miller, 1994). The relevance of these responder characteristics is drawn directly from communication-information processing theory as well as social cognition (Keiser & Sproull, 1982). According to Smith, Grimm and Chen, (1989: p. 443): ". . . competitors can offer responses to a competitive move only if they are aware of the move, are motivated to respond to the move, and if they are capable to responding to the move." If a responder is aware of a competitor's action, the likelihood of a response is greater than if the responder is not aware. If the responder is motivated to respond, implying that the upper echelon of the responding firm interprets the information in the action either as a threat or a significant opportunity, the response likelihood is greater than if the firm is not motivated. Finally, the capability, in terms of assets, endowments and strategies (Smith & Grimm, 1991) of the responding firm, also influences the response characteristics. If the upper echelon assesses that it does not have the capability, in terms of resources, to respond, response likelihood is lower. If it does choose to mount a response, the time to respond is longer, as it takes time to acquire and deploy the resources (Barney, 1991; Peteraf, 1993a; Cool & Dierickx, 1993) underlying a specific capability (Chen, et al., 1992, 1994).

Although they contribute to the theoretical refinement of the model, the few empirical studies leave a gap in the investigation of the model and its application in explaining and predicting competitive interatction among firms in an industry. The theoretical presentation of the CIP model (Smith & Grimm, 1991) set forth five groups of propositions regarding the determinants of response lag. Each group of propositions, except one, has had components subjected to empirical research in the U.S. airline industry. The untested proposition from the theory underlying the CIP model regards the influence that homophily is expected to have on reponse lag. Homophily represents the degree of similarity between the actor and responder. Homophily represents both an actor and responder characteristic which is explicitly discussed in the theoretical development of the CIP model (Smith & Grimm, 1991), but which has not undergone empirical testing. The proposition developed by Smith and Grimm (1991) concerning homophily states that as similarity between actors and responders increases (e.g., their products or services are very similar) response lag will decrease.

At first blush it may appear that the study reported by Chen and MacMillan (1992) might begin to address the issue of homophily and its expected influence on the model. However, competitor dependence was defined from a responder's perspective as the extent to which the responder relied on the markets affected by an action. Markets upon which a potential responder relies can come under attack from firms that are similar to or dissimilar from the potential responder (Porter, 1980). Therefore, the measure of the competitor

dependence variable does not fully operationalize the homophily construct. On the other hand, if we were to take competitor dependence as a valid operationalization of homophily, what are we to make of the finding from Chen and MacMillan's (1992) study which is contrary to Smith and Grimm's (1991) proposition regarding homophily? A more focused operationalization of homophily could possibly result in support for the relationship proposed by Simth and Grimm (1991). If it does not, then the role of homophily would be reduced to zero in the CIP model.

In summation, the studies to date that utilize the CIP model as their point of departure to explain and predict competitive behavior and competitive interaction have not addressed the role of homophily. If homophily is central to the model, if it represents an important construct capturing both actor and responder characteristics, and if it is expected to have an influence on response characteristics, it should be tested. The present study addresses the gap in the extant literature on the CIP model by attempting to provide empirical support for the proposition that homophily influences response lag and investigates the influence that homohily may have on other response characteristics, such as response likelihood and response matching.

The basis for the current study is the intersection of the theoretical concepts of the CIP model and those of the Strategic Groups literature base. Before presenting the rationale for investigating this intersection, the following section presents and discusses the theoretical and empirical foundation of the Strategic Groups construct.

STRATEGIC GROUPS

Industry structure has long been posited as a constraint on competition within an industry (Bain, 1956; Porter, 1980; Cool & Schendel, 1988; Boeker, 1991). One aspect of industry structure--the strategic group--was identified by Hunt (1972) as groups of firms using differentiated means to compete in an industry. Hunt found that firms within a strategic group were similar in the strategies used to compete, and that several strategic groups could exist within a single industry. This construct has been applied to research in both the Industrial/Organizational (I/O) Economics and the Strategic Management streams of research (Bogner, et al., 1994) and has been the basis for several theoretical and empirical studies (Day, et al., 1995; Tang & Thomas, 1992). Strategic group research has been conducted to describe the structure of a number of industries (Day, et al., 1995).

A strategic group is a group of firms in an industry that are similar along key strategic attributes (Feigenbaum & Thomas, 1990; 1993; Cool & Dierickx, 1993), having made similar decisions in key areas (Porter, 1980). Firms within a group are more similar to one another along stated strategic dimensions than to firms from other groups; firms from different groups are asymmetric along the strategic dimensions of interest. The strategic dimensions generally used to assess symmetry/asymmetry represent product/market scope and resource bundles (Cool & Schendel, 1988; Feigenbaum & Thomas, 1993). Differences in these strategic dimensions are taken to result from upper echelon discretion in domain selection, domain navigation, and resource allocation (Bogner, et al.,

1994). As such, a firm's profile along strategic dimensions is a result of a strategic decision-making process within the firm.

Strategic groups have been presented in the literature as having an influence on the flow and interpretation of information among firms in an industry (Harrigan, 1985). The outcome of this differentiated flow of information resulting from strategic group structures is not clear from the strategic group literature. Some indicate that this flow results in a greater opportunity for collusory behavior (Porter 1980; 1985; Harrigan, 1985), resulting in reduced competitive interaction between firms within groups. Others state that this flow of information and its interpretability should result in greater levels of competitive interaction, hence rivalry, within strategic groups (Cool & Dierickx, 1993).

Empirical research seems to confirm the existence of strategic groups (Tang & Thomas, 1992). Strategic groups have been found to exist in several different industries, such as the pharmaceutical industry (Cool & Schendel, 1988), the insurance industry (Feigenbaum & Thomas, 1990) the global automotive industry (Nohria & Garcia-Pont, 1991) and the global computer industry (Duysters & Hagedoorn, 1995). Day (1995), in a recent review of strategic groups research, provides a list of 45 research articles focusing on strategic groups in 18 different industries over the period 1972 to 1993. Several theoretical perspectives have been used to argue the existence of groupings within an industry.

Theoretical Perspectives

There are four primary theoretical perspectives upon which the argument for the existence of strategic groups has been founded. First, groups may develop from strategic choices made firms in their risk posture, skill development and asset investment, with firms making similar strategic choices clustered in the same competitive space (Cool, 1985). Second, Caves and Porter (1979) suggest that the emergence of group structures depends on whether firms choose to *respond* to competitors' *strategic initiatives* in a systematically different manner (Tang & Thomas, 1993). If there is a systematic difference, a group structure emerges in the industry. In a study of 50 manufacturing industries, Hergert, 1987, found that the number of strategic groups ranged from one (i.e., no systematically differential reaction to strategic initiatives) to six (i.e., at least six different competitive positions within the industry, with differing profiles on specific strategic initiatives including advertising, R&D ratio, and number of customer segments served). The mode for the number of strategic groups in Hergert's study was four groups in 24 industries.

The third theoretical rationale for the existence of strategic groups holds that previous investments in resources and technology may lead to the creation of strategic groups. Firms which have made previous investments in technology may not be able to shift to new technology due to the costs involved, creating groupings based on available technology and the available options with which to deploy that technology (Tang & Thomas, 1994). Recent work by Cool and Dierickx (1993) has focused on resource stocks and resource flows as a

differentiating factor in strategic group evolution and argues that strategic group membership is a function of past investments in assets.

Recently, the concept of spatial competition has been put forth as a theoretical explanation of strategic groups. Based on the principles of minimum differentiation (Hotelling, 1929) and local clustering (Easton & Lipsey, 1975), the spatial competition argument proposes that product attributes of competing firms tend to be similar. According to Tang and Thomas (1992:325),

> the dimensions of product space can be viewed as the strategic dimensions along which firms choose to compete. With this extension, the principle of local clustering provides the theoretical foundation for the existence of strategic group formation based upon strategic dimensions.

Although not directly cited by Tang and Thomas, one can draw a parallel between their theoretical justification of strategic groups and Hergert's earlier findings. In industries where Hergert (1987) found only one industry-inclusive strategic group, the influence of spatial competition and local clustering could be argued to have been minimal. In industries where Hergert found multiple groups, the influence of spatial competition and local clustering could be posited as having been stronger. This interpretation is consistent with the theories developed by Hotelling (1929) and Easton and Lipsey (1975), which Tang and Thomas applied as justification for the emergence of strategic groups in an industry.

Another recent development in strategic group research has been the application of cognitive taxonomy as a theoretical justification for the existence

of strategic groups in an industry (Bogner & Thomas, 1993; Peteraf & Shanley, 1997; Porac et al, 1987; Reger & Huff , 1993). Adherents to this argument for the existence of strategic groups suggest that cognitive taxonomies result from the implicit classification schemes of the competitive environment used by the upper echelon within a firm and that these schemes cluster firms into groups according to *similarities*. The cognitive taxonomy provides a mental model of the competitive environment and provides a means to "frame a conceptual structure of [the] competitive environment in order to monitor the environment and formulate strategy" and to focalize environmental scanning (Tang & Thomas, 1992:326).

Bogner and Thomas (1993) suggest that this conceptual structure of the competitive environment influences the sense-making process and strategic choice. Cognitive classification schemes provide a summary of the competitive environment and act as reference points for strategic choice and competition. Because these mental models result from decision makers' assessment of similarity of their firm to other firms in the industry (Porac, et al, 1987; Huff & Reger, 1992) and these mental models influence strategic choice, Tang and Thomas (1993) propose that "mental models of competition in an industry determine the strategic group structure of that industry, and firms in the same group will be considered stronger competitors" (1992:327).

Bogner and Thomas (1993) synthesize the Industrial/Organization (I/O) roots of strategic group theory with the organizational behavior (OB) origins of cognitive taxonomy in order to develop a model which indicates that the

economic and objective strategic groups (i.e., the I/O concept of groups as a facet of industry structure) influence the cognitive groupings perceived by the firms' decision makers (i.e., the OB perspective of groups as a result of an enacted cognitive process). Enacting the perceived environment leads to actions that serve either to reinforce or alter the strategic grouping. Thus, we observe in an industry time periods with a stable group structure and other time periods with change and transition to a new strategic group structure. The model developed by Bogner and Thomas (1993) links the objective environment with the perceived environment to explain the link between strategic groups and strategy formulation.

Empirical Findings

Empirical strategic group research has focused predominantly on three major themes: (1) the relationship between strategic groups and performance; (2) the derivation of strategic groups; and (3) the stability of the strategic group structure over time. Each of these will be discussed in order.

Relationship between strategic groups and performance. This has been a central theme in strategic group research (Cool & Schendel, 1988; McGee & Thomas, 1986; Thomas & Venkatramen, 1989; Bogner, et al., 1994). Within the I/O economics tradition of organizational research, the emphasis on strategic groups has been to relate performance to group membership (Porter, 1980; Cool & Schendel, 1988). Several studies have been undertaken in this vein, with equivocal findings. While some studies have found support for the existence of a strategic group-performance relationship, the existence of a direct

link between group membership and firm profitability appears questionable (Cool & Dierickx, 1993) and the predictive validity of strategic groups in terms of performance has been weak. The lack of agreement in findings on the predictive validity of the strategic group construct for performance is troublesome, given the origination of the concept in the ***structure → conduct → performance*** paradigm reflecting the I/O economics influence of strategy research. The lack of any definitive finding regarding the relationship between group membership and performance leads one to ask if the strategic group construct has any predictive validity on the conduct of firms within an identified grouping.

The derivation of strategic groups. This area of research has focused on how groups in an industry are identified; the variables used as proxies for strategic decisions (i.e., areas of firm behavior influenced by managerial choice) representing product and market scope, and resource allocation; and the statistical method used to determine the underlying groupings from the pattern of product/market scope variables and resource allocation variables. Recent research has focused on the product/market scope and resource allocation areas of strategy content as the basis of identifying grouping variables (Cool, 1985; Deams & Thomas, 1994). The method predominately used to identify groups has been cluster analysis (Barney & Hoskisson, 1990; Harrigan, 1985), though factor analysis and multi-dimensional scaling have also been used.

Stability of the strategic group structure over time. Cool and Schendel (1988), studying a 20-year period in the pharmaceutical industry, presented the first substantiation that strategic groups are a "relatively stable

phenomena" (1988:1120). This finding was also supported by subsequent research. In a study of the U.S. insurance industry Feigenbaum and Thomas (1990) found that most firms belonged to the same strategic group over the 20-year period of their study. Low firm mobility between groups was also observed in the offshore drilling industry, with only two of 679 firms changing strategic groupings (Mascarenhas & Aaker, 1989). Consistent with previous studies, Bogner et al. (1994) found that few firms actually change groups.

Conduct Within Strategic Groups

Few studies of strategic groups have directly addressed the issue of the competitive patterns of firms within strategic groups. When the concept of a change in competitive patterns has been addressed (Cool, 1985, for example), it has been discussed in terms of the entire group moving to different dimensions of strategic space as defined by the product/market scope and resource deployment variables. Given how groups have been identified, this type of change in competitive pattern addresses only how strategies used to compete have changed at the group level; it does not address whether or not the group structure influences the interaction of firms within or between groups.

Recent work in competitive interaction has only just begun to address the potential influence that strategic groups may have on competitive action and response patterns (Chen & Hambrick, 1995). The study by Chen and Hambrick, however, looked only at the impact of firm size on competitive interaction. In this study these researchers found that smaller firms took longer to respond to the actions of larger firms, presumably due to differences in capabilities. Although

size has been used as a single variable to identify strategic groups in previous studies (Porter, 1979), scholars studying strategic groups advocate a multi-variate approach to capture the multi-dimensional nature of strategic decision making carried out in firms regarding product/market scope, resource allocation, and process technology (Cool & Schendel, 1988; Thomas & Venkatramen, 1989; Feigenbaum & Thomas, 1990; Daems & Thomas, 1994; Harrigan, 1985). Strategic group research has evolved beyond considering just size alone as representative of strategic decisions made by the management of firms in an industry.

While the strategic group construct has been criticized as being an analytical artifact (Hoskisson & Hitt, 1990; Hatten & Hatten, 1987), if it does reflect a theoretical construct as others suggest (Feigenbaum & Thomas, 1987; 1994; McGee & Thomas, 1986; Tang & Thomas, 1995), then we would expect to see this construct bear an influence on the conduct of firms within groups. Competitive behavior, as a manifestation of the patterns of intended or emergent strategies arising from the upper echelon's strategic decision process, is conduct at the firm level (Hambrick & Mason, 1984). It is this conduct and the information contained therein that is being communicated to other firms in the industry, and captured by the CIP model of competitive interaction. This firm-level conduct may well indeed be influenced by the existence of strategic groups in the industry.

SUMMARY

A newly developed model within Strategic Management research proposes that the process of competitive interaction is analogous to the communication-information process. The model equates components of the communication process with components of the competitive interaction process. A facet of the model which has undergone limited investigation is the influence that similarity between the sender and receiver is expected to have on competitive interaction when characterized as a communication process. This similarity is presented in communication theory as homophily and in the CIP model as a characteristic of the actor, the receiver, and the competitive environment.

The strategic group provides a valuable construct through which to analyze and understand competitive behavior (Tang & Thomas, 1992; McGee & Thomas, 1986; Thomas & Venkatramen, 1989). Strategic groups represent groupings of firms that have made similar resource investments, have similar product/market scope, and a similar conceptualization of the competitive environment.

CHAPTER 3

THEORY DEVELOPMENT AND HYPOTHESES

The framework provided by the CIP model presented in the previous chapter allows the constructs of communication-information processing theory that may result in increased or decreased interaction between entities to be applied to the analysis of competition. From this jumping-off point, this chapter presents the intersection of the two research streams presented in Chapter 2. This chapter also articulates a theoretical rationale for the effect of strategic groups within an industry on competitive interaction.

INTERSECTION OF THE COMMUNICATION-INFORMATION PROCESSING MODEL OF COMPETITIVE INTERACTION AND STRATEGIC GROUPS

The CIP model allows the constructs of communication theory to be applied to the analysis of competition. In order to do this, constructs from organizational and industrial research must be identified that can be used as proxies for parallel constructs in communication-information processing theory. This section presents the homophily construct from communication theory and the strategic group construct from I/O Economics as parallel constructs.

As previously discussed, when an action takes place, the characteristics of the actor and a potential responder to an action have been found to influence the likelihood of a response, the time to respond, and other response characteristics. The specific characteristic of both the actor and responder that is of interest in this study is the homophily between the actor and responders. In communication theory homophily is a characteristic that describes the similarity between the source (the actor) and the receiver (the responder). In their presentation of the theoretical underpinnings of the CIP model of competitive interaction, Smith and Grimm (1991) propose that homophily should influence the dynamics of interaction. This construct enters the model given in Figure 2 as a characteristic of both the sender and the receiver. Smith and Grimm (1991) state that the proposition that more effective communication occurs when the source and receiver are homophilous (i.e., similar) is an important one in the communication literature. They go on to state that "the concept of homophily is used here to describe the degree to which pairs of competitors are alike in terms

of specific assets, unique capabilities and endowments, as well as products, markets, and strategies" (Smith & Grimm, 1991:11). The degree of homophily between the actor and the responder is expected to influence the communication process and influence response characteristics.

The concept of homophily is also introduced in the model through the competitive environment. Smith, Grimm and Gannon (1992:123) clarify this point by stating that "one of the key dimensions by which industries and their structures may vary include homogeneity, or the similarity of competitors in terms of size, resources, strategies, and costs (Aldrich, 1979; Gollop & Roberts, 1979; Hannan & Freeman, 1977)." The structures in the industry resulting from homogeneity give rise to the homophily between entities within the structure.

Because the firm-level characteristic of homophily arises from the industry-level characteristic of homogeneity, the homophily between the actor and responder should be captured by the strategic group construct. Firms within a strategic group share a level of interdependence, due to *similarities* in strategic capabilities (Nohria & Garcia-Pont, 1993) and in product and market scope (Feigenbaum & Thomas, 1990; Cool and Dierickx, 1993). A market has been defined as being a tangible, inter-related set of mutually aware firms that act based on the observed actions of others, summarized through a feedback process (White, 1981). Strategic group theory proposes that the industry is structured into subsets of competitors based on *similarity* in product, market, processes and customers, and that these groupings frame conduct, behavior, decision-making and competition within the industry (Porac & Thomas, 1990;

Porac, et al., 1994; Bogner & Thomas, 1994; Peteraf & Shanley, 1997). Due to these similarities, firms within the same strategic group represent homophilous entities within the communication framework. The strategic group construct of Strategic Management and I/O Economics should serve as a proxy for the homophily construct of communication theory.

This apparent equivalence between the homophily concept of communication theory and the strategic group construct of the I/O literature base directly addresses the primary research question of whether the existence of strategic groups in an industry affects competitive interaction in that industry. Homophily is proposed to influence response characteristics. The argument has been presented that the strategic group construct is an equivalent to homophily. Casting this assessment of strategic groups in terms of the CIP model of competitive interaction yields the proposition that the existence of strategic groups in an industry should influence competitive interaction and response characteristics as operationalized through the CIP model. Due to homophily and the resulting experience in communicating with similar entities, firms within a strategic group may have greater expertise in dealing with one another and therefore a greater source of accumulated knowledge in the upper echelon to interpret the intentions of actions taken by group members (Harrigan, 1985; Heil & Robertson, 1991).

The existence of strategic groups in an industry and a firm's membership within a group should influence competitive interaction (Caves & Porter, 1979; Cool & Dierickx, 1993; Peteraf & Shanley, 1997). The strategic group represents

the structure within an industry--the context within which competitive interaction occurs (Bain, 1959; Hunt, 1972; Newman, 1973). Inclusion of a firm in a strategic group affects the firm's strategic posture and constrains its freedom of action (Pitt & Thomas, 1994). While there is a basic understanding of what strategic groups are, there are conflicting views on how the existence of strategic groups affects the conduct of firms within them. For example, part of the appeal of the strategic group construct is that it captures the intuitive notion that rivalry differs within a group and between groups (Cool & Diereckx, 1993). This intuitive notion, however, does not indicate if firms within groups are more intensely competitive (i.e., exhibit greater competitive interaction) with each other than with firms outside the group. The strategic group literature has not clearly addressed the issue of the directionality of rivalry among firms within and between groups.

Porter (1980) suggests that within-group rivalry is moderate and accommodative: firms in a group generally tolerate each other. Because of the similarity among firms in a group, firms resemble one another closely and recognize their mutual dependence. Recognition of this mutual dependence gives rise to oligopolistic behavior, limiting within-group competition and enhancing between-group competition (Caves & Porter, 1988). On the other hand, Henderson (1983:8) states that "the more similar competitors are to each other, the more severe their competition." Since groups represent firms homogeneous (i.e., similar) along several strategic dimensions, the inference is that competition (i.e., rivalry) is stronger between firms in the same group, than between firms from different groups.

The recognition of mutual interdependence within groups is proposed to influence the flow of communication within the group (Harrigan, 1985). Heil and Robertson (1991) emphasize the influence of similarity on competition, noting that competitors which are similar in their strategies and structures monitor each other most closely and are most able to interpret competitive signals. Pitt and Thomas (1994:85) state that, because groups represent structure, "firms in a group share a common set of products, technologies, customers, and distribution channels, yielding a zero-sum game competition and, thus, intense within-group rivalry." The question of the directionality of rivalry represents, in part, the nature of competitive interaction within an industry.

The lack of a clear perspective on rivalry within and between groups is also evidenced with regard to strategic distance. Cool and Diereckx (1993) build an argument that between-group rivalry is greater than within-group rivalry. This position on rivalry is also based on the proposition that group members recognize their mutual interdependence, an argument couched in the expected oligopolistic behavior of firms within groups (Porter, 1980). However, Cool and Diereckx (1993) draw upon the same literature base to suggest that increasing strategic distance, operationalized as decreasing similarity, "would lead to more competition between strategic groups" (1993:49). However, Hergert (1987) found statistically weak support for the opposite of Cool and Dierickx's proposition: as strategic distance decreased, between-group rivalry increased. Caves and Porter (1977) and Porter (1976, 1979) put forth the argument that

interaction is greater inter-group than intra-group, a position which even Porter (1980) later reverses.

Aside from being the results of aggregate strategic and economic decisions (Bogner & Thomas, 1993), strategic groups represent a cognitive framework that competitors apply to their environment (Porac & Thomas, 1990; Porac, Thomas, & Baden-Fuller, 1989; Reger & Huff, 1993). This cognitive framework provides a cognitive schema for perceiving and understanding the competitive environment, assessing cues, and comparing conduct (Feigenbaum, Hart & Schendel, 1993). The perceptions of strategic group structure are widely shared by industry participants (Reger & Huff, 1993; Peteraf & Shanley, 1997). The existence of stable strategic groups over a period of time gives rise to institutional forces (Dimaggio &Powell, 1983) that serve to forge a strategic group identity of firms within groups (Peteraf & Shanley, 1997). Accordingly, strategic groups are manifestations of the ways in which strategists organize and interpret their environment. As such, they are structures which should influence the enactment processes (Weick, 1979) that strategists use in making decisions to guide their firms and navigate the competitive domain.

At the firm level, theories of inter-firm competition agree that the greater the degree of overlap between a firm's market domain and that of others, the greater the intensity of competition the focal firm experiences (Hannan & Freeman, 1977; Porter, 1980; Scherer & Ross, 1990). Research directly examining the patterns of rivalry between firms within and across strategic groups is limited (Barnett, 1993; Cool & Dierickx, 1993; Peteraf, 1994). However,

if one considers the determinants of competitive response (awareness, capabilities, and motivation) as presented in the Communication-Information Processing Model of Competitive Interaction, one might deduce that the existence of a group structure would influence competitive interaction to be greater within groups than between groups. The question of whether the existence of strategic groupings influence which firms interact more strongly--firms within groups or firms across groups--remains a fertile area for investigation.

The emphasis in the literature placed on the similarity of firms within strategic groups and the dissimilarity of firms across strategic groups addresses the role *homophily* is expected to have in the CIP model of competitive interaction previously discussed. The stability of groups over time indicates that the homophily of firms in a group provides a long-term context within which to interpret signals and frame strategic decision cycles. Firms within these symmetric, homophilous groupings should have similar resource capabilities (Nohria & Garcia-Pont, 1991), an awareness of firms within their own groupings (Porac, et al. 1994; Spender, 1988), experience in interpreting signals from firms in their own grouping (Porter, 1980; Harrigan, 1985), and a motivation to respond quickly to firms within their own grouping, due to the similarities of resource and market scope (Chen, 1996). Chen and colleagues (Chen & MacMillan, 1992; Chen & Miller, 1994) concluded that the factors of awareness, capabilities and motivation would be expected to influence the response characteristics of response lag, likelihood of response, response imitation, and the number of

responders. Although not explicitly stated in the theoretical development of the CIP model, it can be deduced that homophily influences response characteristics through its influence on awareness, motivation and capability. As a parallel construct, the strategic group should also affect response characteristics through the same avenues; Figure 4 outlines these relationships.

NOTE TO USERS

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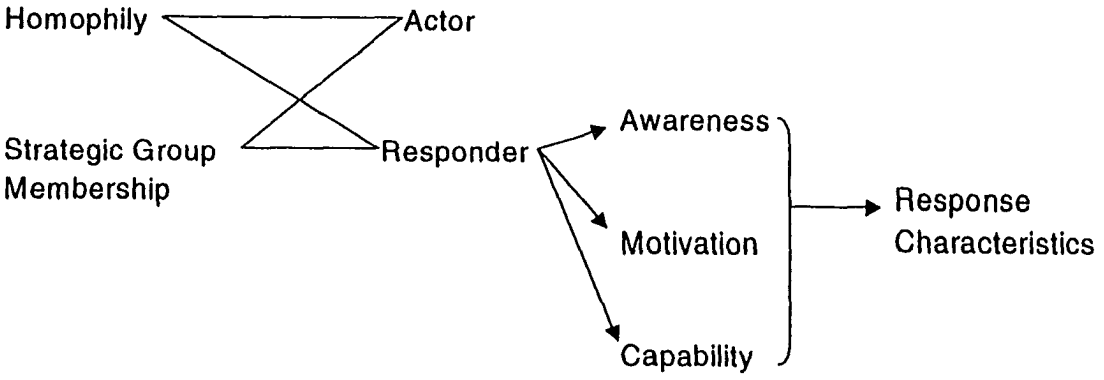
Figure 4
Relationship of Homophily, Strategic Group Membership and Response Characteristics



CAPABILITIES, AWARENESS AND MOTIVATION IN STRATEGIC GROUPS

The model of competitive interaction emphasizes the role that capabilities, awareness and motivation have in shaping the response dynamics between firms. Strategic group theory emphasizes the similarity in capabilities among firms in strategic groups, the level of mutual awareness, and the motivation that firms may have to engage in rivalrous behavior. The following section discusses the theory and empirical findings of strategic group research in the areas of capabilities, awareness and motivation, leading to the development of hypotheses regarding how the concept of strategic groups may influence competitive interaction and response dynamics through the construct's influence on capabilities, awareness, and motivation.

Capabilities

Strategic group theory hypothesizes that firms are homogeneous within strategic groups and heterogeneous between groups. This homogeneity implies a similarity of capabilities among firms within a strategic group (Noria & Garcia-Pont, 1991). Movement from one group to another group is described as being constrained by the presence of mobility barriers and by past resource investment/allocation decisions made by the firm. These investment allocation decisions give rise to capabilities (Ghemawatt, 1990; Barney, 1991).

Mobility barriers are structural factors that protect successful firms from invasions by adjacent competitors, delineate boundaries between strategic groups (Caves & Porter, 1977; Harrigan, 1985), and impede firms from freely changing their competitive position (Mascarenhas & Aaker, 1989). Viewed as a

within-industry analogue to entry and exit barriers, mobility barriers inhibit incursion from outside firms. They make entry into a strategic group costly, due to the different strategic profiles and resource endowments upon which competition in the group is based and the investments made to erect these barriers (Caves & Porter, 1979).

Cool and Schendel (1987) suggest that mobility barriers contribute to the observed stability in the configuration of strategic groups in an industry. Due to mobility barriers, the same firms are incumbents of the same group for an extended period of time. The stability of group membership ranged from five to seven years in their 20-year study of the pharmaceutical industry. Mobility barriers deter movement between groups because of substantial cost, significant lapse of time for a firm to alter its strategic profile, or uncertainty about outcomes (McGee & Thomas, 1986).

Mascarenhas and Aaker (1989) propose that mobility barriers are derived from skills and assets--again an implication of the differing capabilities between groupings of firms. Firms in group A are separated from firms in group B by different skills and assets, or capabilities. If a firm would like to enter a strategic group the "key consideration usually is whether the necessary skills and assets exist or can be developed" (Mascarenhas & Aaker, 1989:476). Skills and assets represent the resources upon which capabilities are based (Barney, 1991). Thus, firms from one group may not have the necessary skills or assets to compete (i.e., respond to an action) with a firm from another strategic group. If they do respond, the response may be delayed due to the time required to

develop the capabilities (i.e., acquire or develop the skills and assets) neccessary to respond to an action.

Past resource investment and allocation decisions yield groupings of firms which are similar in resource bundles within groups, yet dissimilar in resource bundles across groups (Cool, Diereckx & Marten, 1994). Prior investment decisions undertaken by firms affect the range of decisions that can be undertaken to meet challenges and threats facing the firm (Ghemawat, 1990). Past investment limits present resources to bring to play in current competitive situations. Since firms derive their capabilities from their resources, according to the resource-based view of competitive strategy (Barney, 1991), a firm's resource profile should affect its capabilities in responding to an action. It should be expected that firms would respond differentially to actions initiated from within the group than to those actions initiated outside the group, as differences in capabilities differentiate among responders to actions (Chen & MacMillan, 1992; Smith, Grimm & Gannon, 1992). This presentation on capabilities suggests that capabilities are similar within group. It also suggests that differences in capabilities between groups may make it more difficult for firms to respond to out-group actions, while facilitating the interpretation of an action and the response to an in-group firm. Therefore, the strategic group should have an influence on the response characteristics of the CIP model, due to its expected influence on capabilities.

Awareness

The first step in the formulation of competitive strategy is the identification of the firm's major competitors (Porter, 1980). The definitional issue of identifying competitors revolves around interpreting cues from the competitive environment. Porac and Thomas (1990) suggest that cue interpretation involves an assessment about the technological similarity and/or product/market similarity. This reference to 'similarity' along product/market dimensions suggests that firms within the same strategic grouping should be more aware of the competitive cues of group member firms than of firms from other groups (Heil & Robertson, 1990).

In the assessment of the competitive environment, the information selected, interpreted and analyzed by decision makers may be influenced by biases--blind spots--"where a competitor will either not see (i.e., be aware of) the significance of events . . . will perceive them incorrectly, or will perceive them slowly" (Porter, 1980:59). These biases result from structural factors (Zajac & Bazerman, 1991) such as firms not competing in the same strategic space due to difference in product scope, market scope, resource asymmetries, or from the cognitive schema the decision makers apply to make sense of the competitive environment (Porac, Thomas & Emme, 1994; Porac & Thomas, 1993).

Huff and Reger (1993) suggest that strategists within an organization readily perceive strategic groups within their industry. They further contend that these groups provide a means of organizing and making sense of their competitive environment. Caves and Porter (1977) state that firms in a strategic group are *aware* of their mutual interdependence. Research conducted by

Feigenbaum and Thomas (1990) suggests that firms in the same strategic groups are more aware of the actions and behaviors of groups members than non-group members and focus on the behaviors of firms within the same strategic group when making competitive strategy decisions. These researchers have confirmed that the strategic group acts as a reference group. Members use the groups as normative and comparative benchmarks and adjust strategic behavior accordingly. This suggests that firms within groups have a higher level of awareness of each other than of firms in different groups. In terms of the CIP model, firms in the same group should be more aware of actions taken by group members than of actions taken by outside, non-group member firms. This awareness influences the observed response characteristics to competitive actions (Chen, et al., 1994).

The influence of strategic groups on the decision makers' cognitive understanding of their competitive environments is further discussed by Bogner and Thomas (1993). They suggest that objective strategic groupings drive the cognitive strategic groupings that decision makers form of their industry and their place in it. During periods of group stability, the objective structural context influences decision makers' cognitive assessments of the competitive environment. Because of these cognitive assessments, decision makers, during period of group stability, may be more aware of the actions of and interactions among firms in their own group. Hence, it is these cues from within the group that are noticed, interpreted for meaning, and acted upon (Porac, et al., 1994; Heil and Robertson, 1991).

Firms within a strategic group should be more likely to be aware of actions taken by other group members and respond to those actions. Evidence suggests that actors acknowledge, at least implicitly, their firm's membership in groups; this appears to constrain firms' future conduct (Cool, 1985; Cool & Schendel, 1988; Harrigan, 1985). Due to cognitive simplification (Schwenk, 1980), decision makers will be more aware of the actions of the firms that are recognized as similar, and act accordingly (Reger & Huff, 1993). Porter (1980) has suggested that firms in the same strategic group should recognize (i.e., be aware of) each other as close competitors and that firms in different strategic groups are less closely competitive. It should be expected that firms would respond differentially to actions initiated from within the group than those actions initiated outside the group due to the hypothesized influence that strategic group membership has on a firm's attention to and awareness of actions of other firms in the same strategic group.

Motivation

Firms undertake actions to capitalize on an opportunity, or minimize a threat to their competitive position. Firms may be prompted to respond to the actions of others by the observation that the latter have higher performance levels in terms of market dominance (Cool & Schendel, 1988). Performance is based on the competitive advantage of the firm, with the strategic capabilities of the firm being the fundamental source of competitive advantage (Teece, 1988). Each strategic group has a distinctive source of competitive advantage that cannot be easily acquired or imitated by firms in other groups (Nohria & Garcia-

Pont, 1991). Because competitive advantage is a factor contributing to performance, firms are motivated to protect their sources of advantage (Petraf, 1990). An action taken by a group-member firm that utilizes a resource or capability in a manner which returns greater rents is a direct threat to other firms in the same group, and those firms would be motivated to respond to share in the gains anticipated from an action (Feigenbaum & Thomas; 1990).

Motivation to respond to actions of group-member firms also arises from the product/market scope similarities within groups (Chen, 1996). An action taken on either the product or market dimension could be interpreted as a threat to the positions of other firms within the group. The likelihood of response is greater under conditions of perceived threat (Chen & MacMillan, 1992). The actions taken by a group-member firm may be more readily interpreted as a threat than the actions taken by a non-group-member firm (Porac, et al. 1994; Harrigan, 1985; Heil & Robertson, 1991). It should be expected that firms would respond differentially to actions initiated from within the group than those actions initiated outside the group due to the hypothesized influence that strategic group membership has on a firm's motivation to reap rents from its resource investments and to protect its product/market scope position within the group.

EFFECTS OF STRATEGIC GROUPS

Response Likelihood and Lag

From strategic group theory a rationale can be deduced about the construct's influence on the capabilities of firms within groups and the difference in capabilities across groups. A rationale can also be deduced regarding the potential for a greater awareness of firms within groups to actions from group-member firms than from those firms outside the group; and also about the level of motivation to utilize and protect competitive advantage and product/market position. The strategic group literature base provides the theoretical foundation to deduce that strategic groups frame the responder's awareness of an action, its assessment of its capabilities and its motivation to respond. Based on the strategic group's framing of awareness, capability, and motivation, and the influence of these three constructs on a responder's response characteristics, it is hypothesized that the presence of strategic groups in an industry will influence competitive interaction and response characteristics. Thus,

H1: *Firms will respond with a higher frequency--have a higher response likelihood-- to actions originating within a strategic group than to actions originating from outside a strategic group.*

H2: *Response lag will be greater to actions originating outside of the responding firm's strategic group; response lag will be lower for actions originating inside the responding firm's strategic group.*

Also, the discussion on mobility barriers as presented above suggests the influence that strategic groups may have on awareness, capabilities and motivation is incremental, hence,

H3: *The response lag to an action will vary with the height of the mobility barriers between groups.*

Imitation

The strategic group literature also provides a basis to predict the degree to which firms' responses will mimic, or imitate, an action. Mobility barriers protect firms from imitation from firms outside the group (Mascarenhas, 1989; Bogner, et al., 1994). The similarity of strategic capabilities within group provides the basis for an interpretation of the expected benefits to be gained from an action, and how similar capabilities can be utilized to appropriate those benefits. From the work of Feigenbaum and Thomas (1990) as well as from Porac, et al. (1994), the group can be interpreted as providing some institutional forces that influence the behaviors of decision makers and the resultant actions taken by the firm. Institutional theory (Dimaggio & Powell, 1983), then, would be expected to have an influence over the competitive interaction within and between groups. Therefore, imitative responses should be greater within group and lessen as the strategic distance from the acting firm increases. That is, if a firm in a different strategic group is responded to, strategic group and institutional theory would predict that the response does not match (i.e., imitate) the original action. This line of reasoning yield the following hypothesis:

H4: *Response imitation will occur with greater frequency to actions within a group than to actions which originate outside of a group.*

Response Order

Chen and Hambrick (1995) identified a response hierarchy based on firm size. Larger firms responded sooner to actions than did smaller firms. The question from a strategic group perspective is whether a response hierarchy exists within group. Is a specific response order identifiable to within-group actions? From the I/O literature on strategic groups, the group is seen as a means to coordinate the activities within the group (Harrigan, 1985; Petraf, 1993), although this has not been empirically investigated. If there were a "pecking order" within groups, then we would expect to see a consistent response hierarchy. From multiple action events within a group, it should be possible to determine if the response order within group is consistent from action to action. Therefore,

H5: *Firms within a strategic group will exhibit a consistent response hierarchy, based on response order, to within-group actions.*

SUMMARY

The proposition was developed in this chapter that homophily and the strategic group are analogous constructs from two different research streams and that the strategic group should serve as a proxy for the homophily construct in the application of the CIP model. This chapter went on to present hypotheses developed from the intersection of strategic group theory and the CIP model of competitive interaction.

Firms in a strategic group are, in the terms of communication theory, homophilous—similar in characteristics. The existence of strategic groupings within an industry and the membership of a firm to a specific strategic grouping should have an influence on the competitive conduct of the firm within the industry and the strategic group. The influence of the strategic group on competitive conduct should, in turn, manifest itself in terms of the competitive response characteristics of the communication-information processing model of competitive interaction.

The proposition from the CIP model on the expected role of homophily in competitive interaction, the argument for strategic groupings resulting from a cognitive taxonomy of the competitive environment as well as similarity in resource investments, and the finding that strategic groups are stable over a period of time suggests that this study's premise is supported by theoretical grounding in the literature of the two research streams discussed in this chapter.

The constructs within the strategic group literature have been presented and an argument about how these may contribute to the awareness, capabilities

and motivation determinants of competitive response has been proposed. These determinants of competitive response are then used to predict the response characteristics to actions arising within a strategic group and how these dynamics compare to actions arising from other strategic groups. Table 1 presents a summary of the hypotheses and the dependent and independent variables contained in these hypotheses.

Through the application of the strategic group construct to the CIP model of competitive interaction, the current study should shed light on the influence that strategic groups may have on competitive response characteristics among firms in a focal industry.

Chapter 4 presents the discussion of the methodology for this study, the measures for the dependent and independent variables, and the focal industry within which strategic groups were identified.

Table 1
List of Hypotheses and Variables

	Statement	Dep. Variable	Indep. Variable
Hypothesis 1	**RLK to outside-group actions < RLK to within group actions** Where RLK = Response likelihood of firms responding to an action, measured as frequency of responses to in-group v. out-group actions	Frequency of Response to an in-group v. out-group action	Similarity of Actor and Responder characteristic as measured by group membership
Hypothesis 2	**RL to outside-group actions > RL to within group actions**	RL = Response Lag to an action (RL=time in days from initial action to response)	Similarity of Actor & Responder characteristic as captured by strategic group membership
Hypothesis 3	**RL = f(mobility barrier height)** Response Lag is a function of the height of the mobility barriers between the actor's strategic group and the responder's strategic groups. The greater this distance, the greater the response lag	RL = Response Lag (Time in days from initial action to response)	Mobility barrier height between the acting firm's group and the responding firms' groups (Euclidean distance between groups)
Hypothesis 4	**RM(Aig) > RM (Aog)** Among responding firms, Response imitation will be greater to in-group actions than to out-group actions .	RM = Response Imitation (Match between action and response)	Strategic group membership of Actor, Responder
Hypothesis 5	A consistent response order is observable within groups.	Rank order of respondents based on RL	Competitive events in-group (Action, Responses)

CHAPTER 4

RESEARCH METHODOLOGY

This chapter presents the methodology to be used in this study and is organized into the following sections: (1) sample selection; (2) overall research procedure; (3) identification and measurement of dependent and independent variables; and (4) discussion of the statistical analyses used to test the hypotheses.

SAMPLE SELECTION

The focal industry for this study is the U.S. steel industry. Data on competitive actions and responses were collected for firms represented in this industry. The U.S. steel industry was chosen because it was expected to yield a high incidence of competitive events. It is an industry that has been characterized as being in "decline" (Hogan, 1980) and with high exit barriers, making it conducive to high levels of competition (Harrigan, 1980). Selection of this industry expands the domain of previous work on competitive interaction along several dimensions. First, this study attempts to apply the findings derived from a service-based, consumer-related industry (the U.S. airline industry) to a manufacturing, producer-goods industry. Second, competitive members of the steel industry include international firms operating within the U.S. market. There have been recent calls for internationalization within strategic group studies (Hagedoorn, 1995). The issue of internationalization has been addressed by selecting an industry that is global in nature (Roth, 1987). The steel industry is subject to global competition as determined by: (1) the amount of intra-industry trade at world and domestic (U.S.) market levels; and (2) the large number of non-U.S. firms ranked among the top ten producers in the global industry.

Steel producing firms operating in the U.S. from Asia (Japan, Korea), North America (Canada, U.S.) and the European Union (member countries as of 1990) were included in the study. These geographic regions have been selected because: (1) they are historically important in the world steel market--most of the world's largest producers are in these areas; and (2) they coincide with the

location of major industrial countries--steel consumption is linked to industrial consumption.

The firms chosen were U.S. and foreign firms operating in the U.S. steel market identified from the Worldscope/Compact Disclosure database. Firms were selected on the basis of SIC code: 3310 (Iron and Steel Manufacturing).

RESEARCH PROCEDURE

With the focal industry for the study identified, the research procedure requires: (1) identification of strategic groupings within the industry, and (2) identification of competitive actions and responses occurring within the industry.

Identification of Strategic Groups

Data for forming strategic groups was taken from Compact Disclosure/WorldScope, Compustat, and the *Directory of Iron and Steel Plants*. The former two databases were chosen because of the selection and availability of data on publicly traded companies; the latter source was selected because it presents annual data on integrated, mini-mill and foreign steel producers on a number of industry-related variables. Data on industry-related variables is necessary to identify the strategic groups.

Several different grouping procedures have been applied in the research focusing on strategic groups. Porter (1980), for instance, focused on size as a grouping variable. Harrigan (1985) applied a clustering algorithm to strategically significant industry variables, as did Feignebaum and Thomas (1990). These methods of group identification can be classified as objective methods, as they use archival, firm-level data to derive groups. Others, such as Huff and Reger (1993) and Porac and Thomas (1994), have taken a subjective, more cognitively derived, approach towards the identification of groups. This method requires significant input from individuals within the firm. These individuals are usually from the upper echelon and are interviewed or surveyed. This information is then

used to identify the cognitive schema that decision makers apply to their competitive environments. Those firms that have similar views of the competitive environment are classified in the same strategic group.

The choice of grouping method in strategic group research is influenced by the type of research being done (Thomas & Venkatramen, 1989). Large-scale, empirical studies apply objective methods to derive groups. This is generally because these studies involve a large number of firms, or a long period. For these types of studies, the subjective method may be perceived as being too onerous (Reger & Huff, 1993), or there may be a potential for decision makers to revise historical perceptions. Subjective methods of group identification are more generally used in studies that focus specifically on group identification, a small number of firms, or when the required research data is perceptual--based on firms' key informants--and in the same time frame as when the groups are derived (Daems & Thomas, 1994).

The nature of the present study fits the type to which objective methods of strategic group identification are applied. Cluster analysis is the most widely applied objective grouping method (Harrigan, 1985; Feigenbaum & Thomas, 1990; Bogner & Thomas, 1993), and was chosen for this study. Cluster analysis is a multivariate statistical procedure that starts with a data set of information about a sample of entities and reorganizes the entities into relatively homogeneous groups (Aldenserfer & Blashfield, 1984).

The cluster method for forming strategic groups is not without criticism. Barney and Hoskisson (1990) question the validity of the procedure to derive

consistent groupings. Hatten and Hatten (1987) indicate that the appearance of strategic groups may be an artifact of methodology. These issues appear to be rebutted, however, by the findings of temporal consistency in the structure of strategic groups in an industry over time (Feigenbaum & Thomas, 1990)

Cluster analysis for group classification requires the specification of the grouping variables and the analysis of the data to identify the group structure. The selected variables tap firm attributes that reflect the product/market scope and strategic resource dimensions, which are central concepts of the strategic group literature base. The selected attribute variables for this study also reflect product/market scope and resource dimensions. An extensive review of the strategic group literature and steel products and manufacturing literature provided a basis for the firm-level variables selected to use for the identification of strategic groups. These variables are given in Table 2.

Table 2
Resource and Product Variables Used in Group Clustering Algorithm

Resource/Capability Variables	Product Variables
Basic Oxygen Furnace	Sheet
-number	Strip
-capacity	Blooms
Electric Arc Furnace	Billets
-number	Slabs
-capacity	Plate
Average Heat Size	Bars
Blast Furnace	Shapes
-number	Rails
-capacity	Oil Country Goods
Mill Types	Pipe & Tubing
	Blackplate
	Tinplate

The resource/capability variables identified above represent how the company manufactures steel. Ghemawat (1990) characterizes these types of resources as strategic assets. Cool and Diereckx (1994) apply the term resource stocks--what the firm has to work with--to these types of firm-level attributes. These strategic assets, or resource stocks, are utilized by the firm to manufacture their product lines. The capabilities of a firm, and its competitive advantage arise, in part, from these strategic assets (Barney, 1991). The product variables identified above represent the different products that a company produces for the market.

Cluster analysis was used to assess the similarity between firms in the focal industry on key firm attributes listed in Table 2 (Sharma, 1996). There are two general types of cluster analysis techniques: hierarchical and non-hierarchical. The former is used when the underlying group structure is not known; the latter is applied when the number of clusters is known *a priori.* Hergert (1987) analyzed 45 industries and found that the number of groups in an industry ranged from two to six, with a mode of four. However, the steel industry was not included in Hergert's study; therefore, we have no *a priori* basis for seeding the clusters as required for the non-hierarchical technique. The hierarchical technique of cluster analysis was, therefore, chosen for use in this study.

Within the hierarchical clustering technique, an algorithm must be applied to compute distances between two clusters (Sharma, 1996). Because the interest in this study is in maximizing in-group similarity, consistent with the

homophily construct, a method that achieves this objective was chosen: Ward's linkage method. Ward's method was used to identify groupings of firms along similar product and resource attributes identified in Table 2. A calculation of the Euclidean distance between groups is part of the data that results from the application of the clustering method. The closer the Euclidean distance between groups, the more closer the strategic groups are in terms of product/scope and resource/capability attributes. The greater the Euclidean distance, the further apart groups are on the selected attributes. Ward's linkage method forms clusters by maximizing similarity within group and dissimilarity between groups. This clustering method yields groupings of firms homophilous (i.e., similar) on the set of characteristics analyzed, a condition discussed in Chapters 2 and 3 that was expected to have an influence on the competitive interaction among firms in an industry.

Identification of Competitive Actions and Responses.

To be consistent with previous research and increase the possibility for cross-study comparison the definitions and operationalization of the action and response variables follow those of Chen and colleagues (1988, 1990-1996). Chen (1988:111) gives the definition of a competitive action as:

> a specific market move, e.g., a price cut, a market expansion, a special promotion campaign, etc., initiated by a firm in an effort to create a potentially stronger market position vis-a-vis its competitor(s).

A response is defined as "a market move, taken by a competing firm in the industry to counteract an initial competitive action" (Chen, 1988:111).

The methodology used to collect the data on actions and responses within the focal industry is structured content analysis. This method of content analysis was introduced and applied by Jauch, Osborn and Martin (1980) in a comparison of data included in case studies, and was applied by Chen (1988) in the study of competitive interaction in the U.S. airline industry. The data used in structured content analysis is from archival sources, such as case studies, journals, newspapers or trade publications. The application of this technique requires the development of a pre-designed, structured coding sheet to collect data on the variables of interest, in this case the actors, action-type, responders, response-lag.

Data were collected in this manner for actions and responses, consistent with the definitions stated above. Previous application of this technique was done with a single rater to collect the indicated data on actions and responses. Because both action-type and response imitation are binary variables (price/non-price; match/non-match) which must be identifiable from the entry in the archival source, the judgement was made that a single rater was justifiable for the purposes of this study.

Data on actions and responses in the steel industry cover the period from 1991 to 1993 and were obtained from the *American Metal Market* (AMM). This period was chosen because it represents a stable period in demand. In 1994 through 1997, demand for steel in the U.S. market increased. In order to control for the potential effects of changing demand levels on competitive interaction, a stable period was chosen, as periods of decline or increased demand may alter

competitive behaviors in an industry (Harrigan, 1980). The AMM is a daily publication that covers the metal industry, including steel, in the United States. AMM provides news and coverage of items of interest to the decision makers of firms in this industry and is widely read by them, thus meeting the nominal criteria established by Chen (1988) for the selection of archival data source for use in the conduct of this type of inquiry.

Reported incidences that meet the definition of "action" or "response" were coded for the following items: firm name; response/action type; if response, the action type responded to; strategic group of the actor and responder; the date of the response; and the date of the initial action; and whether or not the response was a match to the action. These definitions and operationalizations are given in Table 3.

Statistical Analyses

The statistical tests applied to the tests of hypotheses include chi-square, and linear regression. Each hypothesis discussed in Chapter 3 is presented below with a discussion of the associated test and an initial interpretation of the hypothesis if the test indicates that the hypothesis is rejected, or the statistical evidence fails to reject the hypothesis.

The first hypothesis essentially states that there is an expected association between the group membership of the actor, the group membership of the responder, and the frequency of response to actions. A higher frequency of response is expected to be made to actions initiated by group members than to actions arising from outside a responder's group. The independent variable is

Table 3
Definition and Operationalization of Study Variables

Definition of Variable	Operationalization of Variable
Action	A move announced by a company in the steel industry, as reported in American Metal Market.
Response	A countermove announced by a steel company, to a specific action or actor, as reported in AMM.
Action type	Coded to capture the nature of the action. P=price actions, such as increases or decreases. NP= non-price actions, such as market expansion or contraction or placement of the action within the acting firm's value chain.
Response type	Coded to capture the nature of the response. P=price responses, such as increases or decreases. NP=non-price responses, such as market expansion or contraction.
Response imitation (Dependent Variable)	Match between action type and response type. Discerned from the information contained on both action and response in the AMM (match=1, nomatch=0).
Response lag (Dependent Variable)	The time in days between the action and the response.
Response likelihood (Dependent Variable)	Frequency count of the responses made by a firm to in-group actions (Ri) and frequency count of the responses made by a firm to out-group actions (Ro).
Group membership (Independent Variable)	Indicates if responder and actor are from the same strategic group (same=1; notsame=0). For a response, the group membership of the responding firm is checked against the group membership of the acting firm.

the similarity of group membership between the actor and responder. This is a nominal variable. The dependent variable is the frequency count of responses when actor/responder are from the same group, and when actor/responder are from different groups. Because we are observing frequencies of response and these frequencies are expected to be associated with similarity of group membership between actor and responder, a chi-square test of association is applicable to test this hypothesis. This hypothesis was tested using a chi-square test on the observed frequency of in-group and out-group responses to actions. The null hypothesis is that there is no difference in the observed responses (frequency of responses) and the expected responses between "in-group" and "out-group" categories. If the chi-square test is significant there is an association between frequency of response and similarity of group membership between actor/responder. The association indicates that there is a difference in response likelihood and hypothesis 1 would be supported.

Hypothesis 2 states an expectation that response lag will be greater to actions originating outside the responder's group than from within the responder's group. The difference of means test (*t*-test) is applicable here. The observations of actions and responses represent the "population" of actions and responses during the period. Response Lag, the dependent variable, is an interval variable, as it is measured in number of days from action to response. As with Hypothesis 1 the independent variable is the similarity of group membership between the actor and responder. This is a nominal, or categorical, variable. The null hypothesis here is that there is no difference in mean

response lag to actions originating in-group or out-group. A significant test statistic would lead one to conclude that there is a difference in mean response lag to actions originating in-group v. out-group.

The third hypothesis regarding the expected relationship between response lag and mobility barriers was tested using simple linear regression given by the equation RL = xMOBAR + e; where x is the beta value and e is the error term. Response lag (RL), the dependent variable, is a discrete, interval variable, measuring the time in days between the action and the response. The height of the mobility barrier (MOBAR) is the independent variable. It is measured by the group centroid distance, which is given by the Euclidean distance between clusters of firms obtained from the clustering algorithm (Harrigan, 1985). MOBAR is a continuous variable that ranges from null to the numeric quantity of the greatest Euclidean distance between groups.

The fourth hypothesis stated that response imitation is expected to occur with greater frequency to actions originating within a strategic group than to actions from outside the group. Similarity of group membership between the actor and responder is the independent variable and response imitation is the dependent variable. Both are categorical, or nominal, variables. Similarity of group membership between the actor and responder is expected to influence the frequency of response imitation (match, no-match). Here, as with Hypothesis 1, a chi-square test on the observed vs. expected frequency of response imitation over the two conditions (in-group response imitation, out-group response imitation) is a valid test.

The last hypothesis states that a response hierarchy, based on response order to an initiating action, is expected to exist with groupings of firms. This hypothesis required identifying response order patterns to within-group actions. Groups with multiple actions occurring within them were identified, and the ranking of response order for each within-group competitive action was identified. The within group ranking pattern was compared for each action event within group. The Friedman test for comparison of rank order data was applied. This non-parametric test identifies the ranking of frequencies in blocks as influenced by treatments. In this case, the blocks are the *ith* responding firm in Group *n*, the treatment is the competitive event, and the ranking is the *i*th firm's ranking in response lag (response order).

SUMMARY

This chapter presented the U.S. steel industry as the focal industry to which the CIP model of competitive interaction was applied to determine if the strategic group construct bears an influence on the response characteristics of the model. The methodology for data collection (structured content analysis), the sources of data, and the method for identifying strategic groups (cluster analysis) were described. The next chapter presents the results of the data analysis and the tests of hypotheses.

CHAPTER 5

RESULTS

This chapter presents the empirical results of the strategic groupings of firms in the U.S. steel industry and the tests of the hypotheses identified in Chapter 3, according to the methodology discussed in Chapter 4. The chapter is organized into the following sections: (1) the identification of the firms within strategic groups and the presentation of the Euclidean distance between groups; (2) the categorization of the competitive actions identified; (3) and the empirical tests of Hypotheses 1 through 5.

IDENTIFICATION OF STRATEGIC GROUPS

Identification of Firms and Groups

U.S. and foreign firms operating in the steel industry were identified from the Worldscope/Compact Disclosure database. Firms were selected based on SIC code. Firms with an SIC code of 3310 (Iron and Steel Manufacturing) were initially identified, yielding 108 firms. Firms that were not in Asia, North America, or Europe were eliminated from further inclusion in the study. Therefore, firms such as Iscor (South Africa) and Grupo Sidek (Mexico) were not included in the study, nor were any Latin American firms, resulting in 49 firms eliminated from further study. The exclusion of firms from these regions was suggested by Jacobson: "Industrialized countries and the Western World have greater apparent steel consumption than developing countries, the former USSR/Eastern Europe, China, and other Centrally planned economies" (p.26, 1993). Data on the steel industry indicate that both production and consumption of steel products was higher in the U.S., Europe, and Asia, as compared to Latin America, Mexico, Africa, and other developing nations.

The next screen to determine which firms to include in forming strategic groups was the availability of data on key product/market attributes and production capacity. Data on these attributes (see Table 2) were collected from the *Directory of Iron and Steel Plants* (1992, 1993, and 1994). Data for 21 U.S. firms were available on each of the attributes. Four U.S. firms were excluded at this juncture. These four firms were either not listed in the Directory, or their data were too incomplete for inclusion in the subsequent cluster analysis. Sixteen

foreign firms were listed in the Directory. The 37 firms remaining from the screens and utilized in the cluster analysis to form firm groupings are given in Table 4.

Table 4
Sample Firms

Company	Country	Company	Country
Acme	US	Laclede	US
Bethlehem Steel	US	British Steel	UK
Algoma Steel	Canada	Broken Hill	Australia
Dofasco Steel	Canada	China Steel	Taiwan
Geneva Steel	US	Cockerill-Sambre	Belgium
Inland Steel	US	Hoesch	German
LTV	US	Kawasaki	Japan
Oregon steel	US	Kobe	Japan
Stelco	Canada	Republic	US
USS	US	Roanoke	US
Wheeling	US	Laclede	US
Bayou	US	Nippon	Japan
Birmingham	US	NKK	Japan
Chaparral	US	POSCO	Korea
Florida	US	Sumitomo	Japan
New Jersey	US	Thyssen	German
Nucor	US	Usinor-Sacilor	France
NorthStar Steel	US	Northwestern Steel & Wire	US
Weirton	US		

Utilizing Ward's linkage method cluster analysis, groupings of firms along similar product and capability attributes were obtained. Ward's linkage method forms clusters by maximizing within-cluster homogeneity, resulting in groupings of observations that are similar along a combination of attributes of the product and resource dimensions. This method addresses the product and resource similarity concepts central to the strategic group literature. From this procedure, six clusters were identified. These are indicated in Table 5.

Table 5
Strategic Groups Resulting from Cluster Analysis

Cluster	Firms		Product/Market	
Cluster 1	4 firms:	Acme Geneva Oregon Laclede	Tubing and Pipe Shapes Steel Piling Plate	
Cluster 2	6 firms:	Bethlehem Algoma LTV USS NKK Weirton	Rails Piling Tubing Blackplate Sheet	Structurals Line Pipe Electric Sheet Tinplate Plate
Cluster 3	4 firms:	Dofasco Stelco Wheeling Cockerill-Sambre	Tinplate Shapes Plate	Galvanized Sheet Piling
Cluster 4	6 firms:	Inland British Steel China Steel Kobe POSCO	Plate Sheet Bars	
Cluster 5	8 firms	Bayou Birmingham Florida Steel New Jersey Nucor Republic Roanoke Chaparral NorthStar North Western Steel & Wire	Bars Rebar Shapes Sheet Plate Piling Wirerod Light Structurals	
Cluster 6	6 firms:	Usinor-Sacilor Thyssen Nippon Kawasaki Hoesch Broken Hill Sumitomo	Wirerod Rebar Bar Structurals Shapes Pipe Strip	

Euclidean distance between groups

Table 6 indicates the distances between cluster centroids. This table indicates that clusters 4 and 3 are the closest (i.e., most similar), with a centroid distance of 3.8763 and that clusters 2 and 5 are the farthest (i.e., most dissimilar), with a cluster centroid distance of 6.8782. Note that clusters 4 and 6 are also proximal, with a centroid distance of 3.9088. Also note that clusters 3, 4 and 6 are predominantly comprised of firms from Europe, Asia, and Canada, while clusters 1, 2, and 5 represent primarily U.S. firms.

Table 6
Euclidean Distances Between Groups

Cluster	1	2	3	4	5	6
1	-	4.7892	4.2700	4.2256	4.3074	4.9514
2	4.7892	-	5.1999	5.0406	6.8782	4.6993
3	4.2700	5.1999	-	3.8763	4.6218	4.7907
4	4.2256	5.0406	3.8763	-	4.8862	3.9088
5	4.3074	6.8782	4.6218	4.8862	-	4.7751
6	4.9514	4.6993	4.7907	3.9088	4.7751	-

CATEGORIZATION OF COMPETITIVE ACTIONS AND RESPONSES

Over the three-year research period, 487 actions and 262 responses were identified. Three-quarters of the actions were categorized as "non-price actions"; 25% were identified as "price actions." Price increases over the three-year period were the dominant type of price move. Of the 262 responses, 79.8% were price responses, and 20.2% were non-price responses. Table 7 summarizes these data.

Table 7
Summary of Actions and Responses

Year	Price Action	Non-Price Action	TOTAL
1993	53	96	149
1992	21	144	165
1991	17	156	173
TOTAL	91	386	487
Year	**Price Response**	**Non-Price Response**	**TOTAL**
1993	119	17	136
1992	64	27	27
1991	26	9	9
TOTAL	209	53	262

To be consistent with Chen (1988), the types of competitive moves were categorized. The most common type of action taken across groups was a pricing action, followed closely by an "upgrade" (i.e., investment in plant and

equipment), and then by a cutback in operations or facility closure. Table 8 summarizes the action categories.

Table 8
Categories of Actions Observed

Action Type	Frequency
Upgrades (Plant & Equipment, Capital Investment)	14% 66
International Actions	11% 56
Cutbacks / Plant, Facility Closures	10% 50
Changes in Organization Structure	8% 38
Market Expansions/ New Facilities	8% 39
Process Innovations	7% 36
Divestments (Sale of Operating Units, Equipment)	5% 25
Joint Ventures Joint Agreements	4% 20
Product Innovations	4% 19
Regulatory Actions	2% 10
Mergers/Acquisitions	3% 12
Operations Restarts	2% 9
Market Retrenchments	1% 6
Pricing Actions	18% 91
TOTAL	487

TESTS OF HYPOTHESES

Hypothesis 1

Hypothesis 1 stated an expected relationship between the likelihood of a response to an action and the origin of an action (in-group, out-group). A higher frequency of response is expected to actions initiated by firms in the responder's strategic group. The responses made over the 1991 to 1993 period were identified as being made to an in-group action or an out-group action. The resultant frequencies of the observations were then compared to those frequencies expected if there were no influence from group membership. Table 9 summarizes the observed frequencies and expected frequencies of in-group and out-group responses. The resulting $\chi^2 = 5.10$, which is greater than the expected level (3.84) at the .05 level of significance. Hypothesis 1, therefore, is supported: firms were more likely to respond to within group actions than to actions arising from outside the strategic group.

Table 9
Results of Hypothesis 1 Test:Response Type by Actor's Group Membership

Response Type	Expected Frequency	Observed Frequency	Calculated Chi-square
In-group	113	130	2.55
Out-group	113	96	2.55
Total	226	226	5.10 (*df*=1)

Hypothesis 2

Hypothesis 2 stated that firms would take longer to respond to out-group actions than to in-group actions. For each response identified in the test for Hypothesis 1, the time lag in days was calculated between the response date and the action date. Therefore, if a firm made a response, as reported in *American Metal Market*, to another firm in its group on 12/6/93 and the action occurred on 12/1/93, the lag for this in-group response was recorded as five days. The mean response lag was calculated for in-group responses (10.2 days) and out-group responses (17.1 days). Table 10 gives the results of the test for the difference between in-group response means and out-group response means. Hypothesis 2 is supported at the .01 level of significance (p=.0000): there is a difference between mean response rates to in-group and out-groups actions, with firms responding, on average, seven days sooner to in-group actions as compared to out-group actions.

Table 10
Results of Hypothesis 2 Test: Response Lag by Actor and Responder Group Membership

Response Lag	n	Mean	Standard Deviation
In-group	134	10.2	10.1
Out-group	107	17.1	13.8
t-value	4.49	*df*=239	*p*=.0000

Hypothesis 3

Hypothesis 3 expected a relationship between response lag (RL) and the height of the mobility barriers (MOBAR) between groups. MOBAR is given by

the Euclidean distance between groups (ref. Table 5.2). Only out-group responses were utilized for this test, because the relationship of interest is that of the mobility barriers between groups, and the lag in initiating a response. For each out-group response, the response lag and the Euclidean distance between the responding firm's group and acting firm's were identified. For example, if a firm in strategic group 1 made a response to an action by a firm in strategic group 2, the response lag in days and the Euclidean distance between the two groups, in this case 4.7892, were recorded for the competitive event (i.e., the action/response pair). Table 11 summarizes the regression equation.

The data were analyzed with the Minitab statistical analysis software package. The results of the regression analysis of RL on MOBAR indicate that MOBAR is a significant predictor of response lag ($p=.007$) and that the regression equation derived from the analysis is also significant ($F=7.54$, $p=.007$). The equation indicates that MOBAR is negatively related to response lag. Because Hypothesis 3 was stated as non-directional (i.e., two-tailed), Hypothesis 3 is supported: response lag does vary with the height of the mobility barrier between actor and responder. Specifically, response lag varies negatively with the height of the mobility barriers. The closer the strategic group of the outside actor to the responder's strategic group the longer a period of time passes before a response is made. In comparison, responses that are more rapid are made to actions arising in groups that are separated by a greater distance (i.e., higher mobility barrier). The significance of this finding is discussed in Chapter 6.

Table 11
Results of Hypothesis 3 Test: Regression of Response Lag on MOBAR

Equation	RL = 35.11 – 3.36 MOBAR		$F = 7.54$, p=0.007, R-sq. = 6.9%	
Predictor	Coefficient	St.Deviation	t-ratio	p-value
Constant	35.11	6.853	5.11	0.000
MOBAR	-3.358	1.223	-2.75	0.007

Hypothesis 4

Hypothesis 4 investigated whether responses matching (i.e., imitating) an action were related to group membership of the actor and responder. Each in-group response was identified as either matching or non-matching the acting firm's move. The same was done for out-group responses. Table 12 presents the contingency table resulting from the frequency counts of matching and non-matching responses to in-group and out-group actors. The data indicate that there is a significant relationship between in-group/out-group response and whether the response is a match or non-match to an action. Firms responding to in-group actors are more likely to match the action; when responding to non-group actors, the action is not likely to be matched ($\chi^2 = 22.9$, $df = 1$, $\alpha = .05$).

Table 12
Results of Hypothesis 4 Test: Response Type by Actor's Group Membership

Source of Action	Matching Responses Observed (Expected)	Non-matching Responses Observed (Expected)	Total
In-group	115 (99.21)	66 (81.79)	181
Out-group	16 (31.79)	42 (26.21)	58
Total	131	108	239
Chi-square = 22.919 *df*=1			

Hypothesis 5

Hypothesis 5 stated that firms responding to an action were expected to form a hierarchy, or pecking-order, to actions arising within groups. Actions in strategic groups and the responses they generated were identified from the action-response data collected for this study. However, not every firm in a group responded to every action. Because this situation resulted in missing data in the actor-responder matrix, this hypothesis was not testable using the non-parametric Friedman test for the comparison of rank-ordered data. This test is a non-parametric equivalent to ANOVA, but, because the cell values are based on the ranking of firms on the occurrence of interest (in this case response lag to an in-group action) the test cannot handle missing data. While this hypothesis was not statistically testable due to the distribution of the data, visual inspection was utilized to deduce the possible response hierarchies within groups.

The two most active groups were identified: strategic group 2 (SG2) and strategic group 5 (SG5). Within group 5, whenever Nucor made a move,

Chaparral was most frequently the first respondent, responding to 54% of Nucor's moves that generated an in-group response. Chaparral was closely followed by Northwestern Steel and Wire, which was first respondent to 46% of Nucor's moves that generated an in-group response. With moves initiated by Chaparral and responded to in-group, Northwestern Steel and Wire was predominately the first respondent (91%) among responding firms. Northwestern was also a primary respondent to moves initiated by Bayou Steel. In cases where Bethlehem Steel initiated actions that were responded to in group 2, USS was the most common first respondent (66%), followed by LTV (33%). When actions were initiated by USS, Bethlehem was most often the first respondent (66%), followed by LTV (33%). Based on these observations, there does appear to exist a "pecking order" to actions made within groups. While these observations do not empirically validate Hypothesis 5, they do suggest that a consistent response order, or "pecking order" exists to actions made within groups.

SUMMARY

This chapter presented the results of the cluster analysis of firms in the U.S. steel industry, and the strategic groups formed by analysis of the product and resource variables identified in Chapter 4. Six groups were identified. These groupings were then used to test the relationships regarding response characteristics presented in Hypotheses 1 through 5, to determine if strategic groups have an influence on the competitive interaction in an industry as captured by the Communication-Information Model of Competitive Interaction presented as discussed in Chapter 2.

The findings indicate that response likelihood is related to the source of the action, i.e., firms were more likely to respond to in-group actions. Firms also responded more quickly to in-group actions. As the distance between strategic groups increased, response lag decreased. Firms that responded to an action were more likely to imitate the actions of in-group firms. The empirical support for the hypotheses implies that strategic groups do influence competitive interaction. The primary thesis of this study is, therefore, supported.

CHAPTER 6

DISCUSSION

The purpose of this study was two-fold. The first objective was to extend the generalizability of the CIP model to a different industry domain from which it had been applied and from which theory regarding the model had been developed. Support for four of the five hypotheses indicates that the model and the theory upon which it is built do generalize through large-scale empirical investigation to an industry beyond the U.S. airline industry. The second objective of the study was to determine if the strategic group construct had an influence on competitive interaction in a focal industry. In this study the strategic group construct of the Strategic Management and I/O economics research streams was identified as a potential proxy for the homophily construct of communication-information theory. As a proxy, the strategic groups construct would be expected to exhibit similar associations as homophily with key variables of the CIP model. Competitive interaction in the U.S. steel industry was observed through the application of the Communication-Information Processing Model of Competitive Interaction. In this study, Hypotheses 1 through 4 were supported at significant levels. The support of these hypotheses, which were developed by applying the theoretical reasoning of the strategic group literature to the constructs of the CIP model, strongly suggests that the strategic group construct may well indeed have an influence on competitive interaction in the industry observed.

COMPETITIVE RESPONSES: LIKELIHOOD, LAG, MATCHING AND HIERARCHY

The strategic group literature presented in Chapter 3 delineated how the strategic group construct, as a proxy for the homophily construct of communication-information processing theory, was expected to influence the action-response dynamics of competitive interaction through the latter construct's proposed influence on awareness, capabilities and motivation. The empirical support for Hypotheses 1 through 4 clearly identifies a relationship between strategic groups and competitive interaction, as captured by the CIP model.

Hypothesis 1

The support for Hypothesis 1 suggests that firms are more likely to respond to actions made by group members than by non-group members. It can be deduced from theory that greater awareness of group member firms (Harrigan, 1985; Caves & Porter, 1979) may contribute to this greater likelihood of in-group response. However, these researchers proposed that greater awareness of mutual dependence would *lessen* the level of rivalry (competitive interaction) in-group. The support for this hypothesis suggests support for the proposition of Cool and Diereckx (1987) and Hergert (1987) that firms in groups are more strongly competitive (i.e., stronger rivals). It can also be deduced that the within-group resource similarities may provide the basis of capability necessary to organize a response to an in-group action. The grouping methodology maximizes homogeneity within and heterogeneity between groups, resulting in groups that are dissimilar in product scope and resource profiles.

Since resources beget capabilities, the findings suggest that it may be easier for firms to muster the capabilities to respond to in-group actions and that it is more difficult (i.e., less likely) for firms to respond to out-group actions. Motivation may also play a role in this finding. Capabilities provide a foundation for competitive advantage (Barney, 1991). Since competitive advantages may be competed away if they are not unique and inimitable, not only may it be easier for within-group firms to respond to one another due to resource similarities, but the potential loss of an incremental competitive advantage may motivate firms to respond more quickly to within-group actions.

We must recall that the level of threat, within the CIP framework, is assessed 'real-time' as the action and the possibilities of response are being cognitively processed by the potential respondents' upper echelons. Therefore, due to the perceived impact on competitive advantage, a move by a strategic group member, operating in similar product/market space, may be perceived at the time the information is assessed as a greater threat, resulting in a greater likelihood of response as compared to a move by a firm in another group, operating in dissimilar product/market space.

It must be recalled that the strategic group construct was used as a proxy for homophily, and that homophily is *proposed* to influence competitive interaction through awareness, capability and motivation. The archival nature of the research design did not allow for the relationship between strategic group membership and awareness, capability and motivation to be specifically teased out at this stage. The redress for this issue is discussed in the section presenting

the limitations to the current study.

Hypothesis 2

The data support the hypothesis that it takes longer (i.e., higher response lag) for firms to respond to out-group actions compared to in-group actions. Whether the responses were made to in-group or out-group actions, there must have been some motivation to respond to the actions, since, according to Chen and MacMillan (1992), motivation is a necessary condition for response. The lag, therefore, could be explained as a difference in the responders' awareness of the actions or the responders' capability. These findings provide support for Harrigan's (1985) claim that firms in the same group are more aware of each other, suggesting that it takes longer for firms to become aware of the action, or the degree of threat an action presents, by an out-group firm.

Harrigan's premise is that in-group firms can interpret communications from other group members more readily that those from outside the group. These findings appear to substantiate that premise. Response lag should be short if a firm is aware of an action, is motivated to respond, and has the capabilities to respond. The greater response lag between groups indicates that firms may not be aware of an out-group action, or, if aware, it takes time to process the impact that the move has on the firm. This impact provides the motivation to respond. Given the motivation, the dissimilarity of resource profiles may limit the capabilities of a firm to respond. This limitation in capabilities contributes to response lag, as firms attempt to reconfigure or acquire assets or reassess their position to respond; reconfiguring, aquiring and reassessing take

time (Mascarenhas & Aker, 1992; Cool & Diereckx, 1993).

The finding for Hypothesis 2 also supports the concept that past resource investments limit the decision alternatives available to top management (Ghemawat, 1990; Tang & Thomas, 1994). From a decision making perspective, responses to similar competitors utilizing similar strategies and similar resources to compete in similar markets may be more of the programmed versus non-programmed variety. Programmed decisions are more easily and quickly made and implemented than non-programmed decisions. On the other hand, responding to out-group actions may require more non-programmed decisions to accommodate "new" information passing through the sense-making process. Non-programmed decisions take longer to make and implement.

This characterization of the decision types applied to competitive situations can be inferred from the cognitive simplification and cognitive framing that strategic groups are said to provide to the decision-making process. Since Feigenbaum and Thomas (1990) refer to strategic group members as referents to firms within group, the actions from these firms may pass through the sense-making process as structured problems.

Hypothesis 3

The data support the hypothesis that response lag varies with the height of the mobility barriers between groups. This hypothesis was stated without directionality due to the equivocality of previous findings in strategic group research and due to the conflicting arguments that have been conceptualized. The finding that response lag is negatively related to the height of mobility

barriers is perhaps the most important finding in this study. This finding indicates support for the line of reasoning in the strategic group literature that groups with a greater strategic distance, as measured by Euclidean distance (i.e., higher mobility barriers), are more intense rivals than groups that are closer. The empirical support for this proposition in the literature has been limited. This finding, therefore, lends support to the proposition that the greater the strategic distance between groups the greater the rivalry between groups. Because of the equivocal findings regarding this proposition, the hypothesis relating response lag and Euclidean distance merits testing in other industry contexts in order to determine if this finding holds in other industry domains. Since the responses to in-group actions were eliminated from the data pool for the test of this hypothesis, and the mobility barrier between firms in the same group is zero, the finding of support for Hypothesis 3 implies that an inverted U-shape relationship exists between response lag and distance. This is deduced from combining the finding of Hypothesis 2 with the finding from Hypothesis 3.

The implication of this finding for the Communication Information Processing Model of Competitive Interaction is that there may be a response hierarchy to actions among groups. First, given an action, firms are more likely to respond and respond in a more timely manner to in-group firms. Second, firms are not as likely to respond to out-group actions, but when they do, there may be a greater awareness of and motivation to respond to out-group firms at a further distance, even though capabilities are dissimilar. Third, firms in out-groups that are "close" may only require careful watching to interpret the impact

of their actions, rather than mounting an all-out quick response.

But, why do firms from distant groups appear to elicit a quicker response than firms in closer groups? The theory behind the CIP model would argue that motivation may be the driver in the difference in response lag to near out-group and distant out-group firms. According to Chen and Miller (1994), response lag is lower when motivation to respond is high. When the responding firms assess the action as a significant, credible threat, they are motivated to respond.

One explanation to the differntial response lag may lie in the threat that an action presents from the perspective of the responding firm's upper echelon. Firms from distant groups may pose a greater perceived threat (i.e., provide more motivation to respond) than firms from closer groups. The "message" interpreted from the action of the distant out-group may be understood as more threatening than the action of a near out-group. For example, firms from distant groups could be interpreted as "invading" a group's product/market space with different, or innovative, resource profiles, therefore requiring a swift response to parry the action. Porterian strategy would call for the responding firm to make a pre-emptive statement (i.e., response) to the incursion of the out-group firm. If a move is interpreted as a credible threat, response lag will be lower than if the action is not interpreted as a significant threat by the responding firm (Chen & MacMillan, 1992).

Figure 5 details the possible association among action source, threat assessment, and response lag in terms of a responder's awareness of an action by either a distant or near out-group firm. From the theory underpinning the CIP

model, high response lag is associated with a low assessment of threat. The finding of support for Hypothesis 3 would appear to contradict the influence that strategic groups may have on awareness, as earlier stated. This contradiction, however, can be explained. Response lag is measured from the time of the action to the time of the response. It is beyond the scope and methodology of the present study to assess awareness lag; there is no means to directly assess the relationship between awareness and Euclidean distance. The awareness lag for actions of distant out-group firms may be greater than for near out-group firms. The present finding does suggest, however, that, once aware, responders react more quickly to distant out-group firms. Thus, if we decompose response lag into two components we would have the following statement:

$$\mathbf{R_L = A_L + RE_L}$$

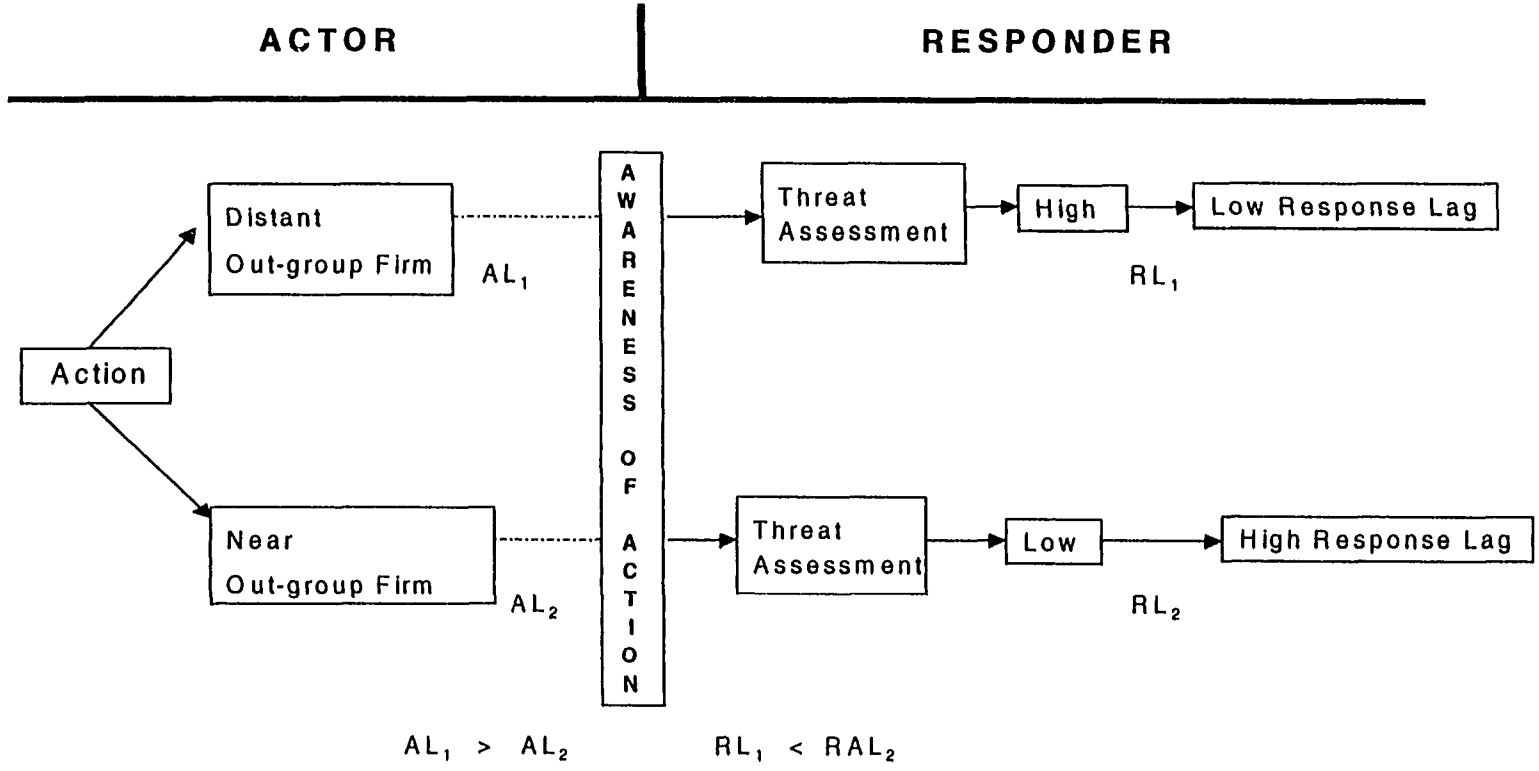
Where,

R_L = response lag

A_L = awareness lag (the elapsed time from action to the time of the responder's awareness of the action)

RE_L = Reaction lag (the elapsed time from the responder's awareness of the action to the response made to the action)

Figure 5
Strategic Group Distance, Threat Assessment and Response Lag



Thus, the current finding regarding Hypothesis 3 suggests the following relationships between near-group and distant-group awareness lag, as depicted in Table 13. The identification of the possible decomposition of response lag into awareness lag and reaction lag has not been advanced in prior research of the application of the CIP model, nor has the potential contingent relationship between the distance of the group source of an action and the levels of awareness and reaction lags.

Table 13
Contingent Relationship Between Group Proximity, Awareness Lag and Reaction Lag

	Near-group	Distant-group
Awareness Lag	***LOW***	***HIGH***
Reaction Lag	***HIGH***	***LOW***

The current findings reflect a very constrained time period in the history of the focal industry. To suggest that the relationship between response lag and group distance is static would be flawed without further investigation across different time periods and in different industries. Even though the stability of groups has been identified as being long-term, the dynamics of group relations have barely been probed. The relationships among groups, over time, may be more dynamic than the static nature indicated in the current literature. If further investigations consistent with the one presented here identify a dynamic setting, this could be one explanation for the equivocality of previous findings regarding

the levels of rivalry and group distance.

The research done to date on the CIP model does not include a study on the relationship between response lag and the quality (i.e., outcomes) of response. The study of decision speed and outcomes, however, is a growing area in strategic management research (Bourgeois & Eisenhardt, 1988; Eisenhardt, 1989, 1992). Are quick responses to distant out-group actions consistent with the responding firm's intended strategy, or do they represent a step on the pathway to an emergent strategy? Do firms that take longer to react to distant out-group actions fare better in the long-run than firms that are quick to react/respond? These questions are open to further study in the exploration and application of the CIP model. Application of the CIP model in such a manner would contribute to the development of the relationships between top-management consensus, decision speed and performance.

Hypothesis 4

The sample firms were roughly seven times more likely to match an action when responding to an in-group actor than when responding to an out-group actor. This finding addresses the constructs of motivation and capabilities and the influence the strategic group appears to have on these elements of the CIP model. The analysis of Hypothesis 2 suggests that there is motivation to respond to in-group actions. Given this motivation, how would a firm respond? The analysis of Hypothesis 4 suggests that firms may respond to in-group actions by matching the action. It can be deduced from theory and the current findings that the similarity of resource profiles, hence capabilities, may be the operative

construct in the relationship presented in Hypothesis 4. Firms with similar resource profiles have similar capabilities and can better match a response to an action. Firms responding to a firm with different resource profiles (i.e., from a different group) may not have the full array of capabilities, nor understand how the other firm is using its capabilities, to match the action. The responding firm(s) formulates a response to answer the interpreted threat, but may not have the resource profile to match the action. Although firms appear to respond more quickly to distant groups, as suggested by Hypothesis 3, responding firms may not have the capability to match the response to the actions.

Hypothesis 5

Although the data did not allow for an empirical test of this hypothesis, the qualitative observations may be relevant to the strategic group literature. Assessing the behavior of firms within groups is necessary for understanding inter-firm interaction at the group level. This type of assessment has been limited in previous strategic group research (Baum & Korn, 1996).

The current observations are consistent with the proposition made by Chen (1996) regarding competitive asymmetry. This concept holds that firms are not symmetrically competitive: Firm A may perceive Firm B as a primary competitor, but Firm B perceives Firm C as its primary competitor, not Firm A. For example, from the data, when Nucor moves, Chaparral is predominantly the first respondent, indicating a consistently strong motivation on the part of Chaparral to respond to Nucor. However, when Chaparral acts, Nucor rarely responds, but Northwestern is the primary first respondent. This differential

response order may indicate that Nucor and Northwestern do not interpret the actions taken by Chaparral as posing the same level of threat, or that Chaparral and Northwestern do not have exactly the same capabilities to respond to Nucor. In assessing the differential response between Nucor and Northwestern to an action taken by Chaparral, if a lag in awareness of Chaparral's action is not the source of response lag, and differences in capability between the firms is not the source of the reaction lag, then the primary component of response lag could be the reaction lag attributable to motivation. Given that the CIP model holds that the responder assesses the action for information content, the upper echelon of Nucor and Northwestern, through their respective sense-making processes, may be making different interpretations regarding the degree of threat posed by Chaparral's actions.

Based on the observations resulting from the failed empirical analysis of Hypothesis 5, there is an indication that the behaviors within group are not uniform. Although not statistically testable, the observations of the data form a basis for grounded theory and the inter-relationships within groups bear further investigation to extend strategic group research into considering firm-level behavior within groups.

The observed interactions also make the consideration of first-mover advantages within group a potentially fruitful area for further research. Strategic Management literature places a heavy emphasis on first-mover advantages (Leiberman & Montgomery, 1988). This concept, however, is generally assessed at the industry level. It would be expected that each group identified in an

industry would have one or more consistent first-mover, early-follower, and late-follower cohorts. Future assessment of these cohorts is relevant due, in part, to the potential performance implications (Leiberman & Montgomery, 1988) within group. The identification of these co-horts within a group would perhaps explain the equivocal performance findings among firms within groups that has beset strategic group research (Barney & Hoskisson, 1990).

STRATEGIC GROUPS

The finding that groups 2 and 5 are separated by the greatest Euclidean distance (i.e., mobility barriers) reinforces our intuitive reasoning about this industry: 'integrateds' and 'minimills' form very distinct groupings. Even though no dummy variable was set to capture the inherent difference between integrated firms (group 2) and minimill firms (group 5), the difference in this dimension was captured by the resource variables identified for inclusion in the cluster analysis.

Prior research on strategic groupings in this industry has broken the industry into 'integrateds' and 'minimills' on the basis of qualitative assignment. The cluster method, using product scope and resource variables, not only reinforced this finding, but also indentified two additional groupings within the U.S. integrated category. Therefore, in the strictest sense of strategic group theory, it is incorrect to identify the industry as being comprised of only two groups.

While the groups were identified using an accepted empirical methodology, there is the opportunity to bridge the quantitative and qualitative methodologies of the strategic group literature. Porac and Thomas (1990), Bogner and Thomas (1993), and Reger and Huff (1993) advocate going beyond the quantitative tradition, to apply qualitative techniques to capture the cognitive aspect of strategic groups. The empirical support for Hypotheses 1 through 4 provides evidence that the quantitatively obtained objective groupings may influence interaction among firms in and between groups. The next step in this line of research is to determine the strategic groupings by applying a qualitative

method similar to that used by Reger and Huff (1993) to capture the cognitive schema at work in the industry. This would allow the empirical comparison of the findings and provide for an empirical extension of the theoretical work of Bogner and Thomas (1993). By comparing and combining the results obtained through varying methodologies, we obtain more complete theories.

The concentrated groupings of foreign firms in the U.S. steel industry are also an interesting finding resulting from this study. Foreign firms were included in groups 3, 4, and 6, even though this was not an attribute directly captured in the grouping methodology. Among themselves, these firms utilize similar resource capabilities and comparable product scope to compete in the U.S. steel industry. It is also not surprising that, during this time period, the firms in groups 3, 4, and 6 made more international moves than firms in groups 1, 2, and 5. According to the literature on environmental scanning, the Asian and European markets would have had greater saliency for groups 3, 4, and 6 (Boyd & Fulk, 1996). When it comes to the lack of out-group response to these international actions, the explanation from Communication-Information Theory would be that the U.S. groups (1, 2, and 5) were not aware of the actions, or if aware did not interpret these international actions as credible; if they did, they may have perceived that they did not have the capability to respond.

Many of the international moves made by firms in groups 3, 4, and 6 were relationship-building actions with steel companies in the Soviet Union, China, Vietnam and greater Asia, or moves to establish presence for Europe 1992. An enlightening extension to this research would be to identify whether the non-

response of U.S. firms was due to a lack of motivation (i.e., no threat was interpreted) or due to an assessment of a lack of capability to reply to these actions.

Non-response to the international actions of groups 3, 4, and 6 also brings to light the potential impact of governmental regulations and trade barriers on the Communication-Information Processing Model of Competitive Interaction. Because prior research on the model has not included an international component, the relationship of governmental regulations and trade barriers on response/non-response behavior has not been addressed. Thus, for example, did U.S. firms not respond to actions to form market relationships in Vietnam due to lack of awareness, motivation, and capability or to the existence of governmental proscriptions against Vietnam? The same question could be posed regarding the other international actions taken and the existence of either real or perceived trade barriers. Although governmental regulations and trade barriers might be broadly categorized under the "capabilities" construct of the model, they should be separately identified, perhaps as environmental constraints on firm-level capabilities, and assessed for their relationship to response, response likelihood, and response lag.

EMPIRICAL AND BEHAVIORAL OBSERVATIONS

Competitive Intensity

Because the number of responses to actions increased over the period, when compared to the relatively flat growth of the actions taken over the period, a response/action ratio was calculated. Table 14 gives the result of this calculation. It reveals that the competitive intensity of the industry, as measured by total responses per year in proportion to total actions taken per year, increased during the period of the study.

Table 14
Competitive Intensity

Year	Price R/A Ratio	Non-Price R/A Ratio	Total R/A Ratio
1993	2.5	.18	.91
1992	3.05	.19	.55
1991	1.53	.06	.20

As seen in Table 14, the competitive intensity of the industry increased over the period of the study from a Total Response/Action ratio of .20 to .91 This indicates that actions were generating more responses in 1993 than in 1991. Although not a specific focus of this study, this finding does merit explanation. According to the running editorial commentary and reporting in the *American Metal Market*, the market for steel and steel products was characterized as improving over the period with forecasts of increases in demand and sales. Such increases characterize a munificent environment. On the surface, this data

suggests that competitive interaction increases with environmental munificence. This is certainly contrary to the propositions of Hannan and Freeman (1977), who argue that rivalry increases when resources in the niche are low and decreases when resources are abundant. Because of this potential contrary finding, the relationship between munificence and competitive interaction should be specifically tested in other industry contexts.

Boundary Spanners

Examination of the relationships of actions and responses between firms and among groups highlighted the existence of "boundary-spanning" firms. For example, there were several occasions where Bethlehem (group 2) responded directly to a move made by Nucor (group 5). However, when other firms in group 2 responded, the response was reported as being to Bethlehem, not Nucor. In this way the awareness and significance of an external action was communicated to the group at large, through the actions of the initial group respondent. This same type of behavior was observed for Nucor for actions occurring in Group 2 and 6. This observed behavior could arise from two possible sources: (1) the groups were incorrectly defined by the clustering algorithm and the product/resource variables chosen; and, (2) the period in question represents a transition period in the structure of the strategic groups.

It is not directly possible to determine if the observation of boundary-spanning behavior is the result of incorrectly drawn groups. However, the empirical results of the study suggesting support for the hypothesized relationships provide an indication that the groups, for this study, were not

incorrectly identified. This problem would be greatly clarified by comparing the results between objectively and subjectively derived groupings as suggested earlier. The comparison would either substantiate the boundary spanning behavior, or indicate that it was an artifact of incorrectly identified groups (i.e., that a firm "should" have been categorized in group X rather than group Y). If the latter is not the case, then the existence of boundary-spanning behavior in firms from different strategic groups is an area that merits further research. This would signify that, not only do firms utilize group members as referents, but a few specific firms utilize out-group firms as referents as well, and, by their response to this out-group action, provide an in-group action to which other in-group firms may respond.

The behavior may also be the result of a transition in the structure of strategic groups. Although it has been demonstrated that strategic groups are stable over long periods of time, group membership does change. The boundary-spanning behavior observed in this study may indicate that firms are in the process of transitioning from one group to another. Previously, research on strategic groups captured the change in groups in a static manner: in year X a firm was a member of group A, in year X+5 a member of group B. The concept of a dynamic transition of firms from one group to another reinforces the proposition made by Bogner and Thomas (1993) that economic transactions lay the groundwork for the objective dimensions of group structure, and provide for the emergence of the subjective, cognitive groups which frame future transactions. From the perspective of Peteraf and Shanley (1997), the boundary-spanning

firms may be undergoing a change in strategic group identity, modeling their competitive behavior and actions after a new group of referents. By applying the model and methodology used in this study, a more dynamic picture of group change and firm transition from group to group, with emphasis on the reasons for transition, would be obtained. This would be a significant extension of the strategic group literature, providing richer information on why and how groups evolve.

LIMITATIONS OF THE STUDY

A limitation on the study's findings results from the focus on a single industry. A broader test of the hypotheses to several industries concurrently would provide a more rigorous test for the influence of strategic groups on the response variables of the CIP model. Few strategic group studies, however, have considered more than one industry at a time. A noted exception is found in Hergert (1987).

The dependence on an archival newspaper source is the greatest limitation to the application of the particular methodology applied in this study. The requirement that specific terminology be present to record an event as a response limited the number of responses to actions. Although it may have been deduceable that a move by a firm was indeed a response to a specific action of another firm, if the article did not include "responding to . . ., following . . ., similar to . . ., in response to . . ., etc." or other key phrases clearly linking a response to an action, the move could not be coded as a response. However, since the publications that cover this industry on a daily basis are limited, and other industries face this same constraint in press coverage, this is not a limitation that is easily overcome. Rather than using a retrospective methodology (i.e., reviewing past issues of a specific trade publication) a more prospective methodology might be warranted. The problem here, however, is the length of time (years) necessary to accumulate sufficient actions and responses for analysis. The positive contribution of a more prospective method would be that, with the participation of key decision makers at firms in the focal industry, the

correlates of awareness, motivation, and capabilities within groups could be more closely examined. This type of design would certainly contribute to a greater understanding of how strategic groups influence awareness, motivation and capability. For example, the empirical support for Hypothesis 3 suggests that firms in group 2 are more motivated to respond to firms in group 5, the most distant group, than to groups that are more proximal (groups 1, 3, 4). Using a prospective method with key informants would allow the research to probe why the actions from the furthest group are perceived to be a greater threat. It is not possible to do this using a retrospective method.

Another shortcoming of the method lies in the journalistic approach to reporting on the focal industry. If the time between action and response is long, the reporter/editor may not reference the firm making, or the date of, an initial action. This may have resulted in "actions" which would have more appropriately been classified as responses. Again, due to the retrospective nature of the methodology applied, longitudinal studies in this areas will suffer from the same limitation. In contrast, a prospective longitudinal design would permit the researcher to ask specific questions to tease out whether a move is indeed an action, or a much-delayed response to another firm's move. The next step in this line of inquiry, then, is to develop and apply a prospective, longitudinal research design that addresses some of the questions raised by the results of the current study.

CONTRIBUTIONS

This study makes several contributions to the two theory bases upon which it was founded. First, it is the only major large-scale replication of Chen's work to date that extends the generalizability of the CIP model of competitive interaction to the manufacturing sector. It substantiates several of the key constructs (response lag, response likelihood, response order) of this research stream and their validity outside the fast-paced, highly interactive U.S. airline industry. Second, the support for the hypotheses corroborates the proposition of the CIP literature base that homophily has an influence in inter-firm communication and information and, hence, competitive interaction. This concept had been proposed, but never directly incorporated in an empirical study of the Communication-Information Processing Model of Competitive Interaction. The empirical support for Hypotheses 1 through 4 suggest that the relationships between homophily and competitive interaction and strategic groups and competitive interaction are transitive. As an equivalent construct, strategic groups may have similar influences on awareness, capability and motivation as homophily is proposed to have. Although the relationships may be deduced from theory, the findings of this study lay the foundation to examine the specific influence that the strategic group construct has on awareness, motivation and capability using finer-grained research methodologies than those previously applied in strategic group research.

The contributions to the strategic group research stream are just as significant. First and foremost is the evidence that strategic groups may have an

impact on competitive interaction, as captured by the Communication-Information Processing Model. Response lag, response likelihood and response type are associated with the similarity of group membership between actor and responder; with group membership capturing the characteristic of similarity among in-group firms along product/market scope and resources. The major contribution here is the potential inverted U-shaped relationship between response lag and mobility barriers and the match/non-match of response made to in-group and out-group actions. This finding implies that, from a responding firm's perspective, close firms (in-group) and distant firms (out-group) are both rivals, but that motivation to respond and the response type reflects the source of the action. The implication is that, within group, firms move quickly to respond to and match the actions of other in-group firms, while they respond quickly, but may not be capable of matching the actions of firms in distant groups. Thus, while both in-group and distant out-group actions may motivate a response exhibiting a low response lag, (i.e., both are perceived as threats), the different resource profiles across groups limits the degree to which the responder can mount a quick, matching response to distant out-group actions

As previously stated throughout the presentation of this study, the strategic group construct was used as a proxy for the homophily contruct. Most strategic group research has focused on group formation, stability and the relationship to performance (Barney & Hoskisson, 1994). It has rarely been applied as a construct outside of the traditional I/O economics stream as a means to explain, support, or refute relationships in models and theories in other

areas of Strategic Management research (Bogner, 1993).

Identifying the apparent equivalency of the strategic group construct with the homphily construct, therefore, is a significant contribution to the strategic group research stream. The findings of support for Hypotheses 1 through 4 lend credence to the continued use of the strategic group construct in Strategic Management research. Contrary to the suggestions made by Barney and Hoskisson (1990), the strategic group construct has validity, and is not a mere artifact of methodology. The discovery that the strategic group construct--based on the similarity of entities in a group--reflects the relationships proposed of a construct from a different field, itself based on the similarity of individuals in a communication-information exchange, signifies that the strategic group construct in not merely an artifact. The identification of a potential relationship between the strategic group construct and the elements of the CIP model indicate that strategic groups have an influence on behavior of the firms within them.

If the strategic group were not an equivalent construct to homophily, it would not have demonstrated the expected results. Had this been the case, the study would have found that the strategic group construct is not equivalent to homophily and that the strategic group does not influence competitive interaction. If the strategic group construct were a mere artifact, it would not have served as a proxy for a similar construct from an unrelated theory base. The study's findings reinforce the theoretical arguments of the role of strategic groups in firm and group behavior (Bogner & Thomas, 1993) and augments the credibility of the few empirical works (Feigenbaum & Thomas, 1994) that have begun to examine

firm-level behavior within groups.

A potentially significant contribution to the strategic group stream of research is the possible discovery of a response hierarchy, or pecking order, within strategic groups. Feigenbaum, Hart and Schendel (1996) suggest that firms utilize other group members as referents. The finding from the current study suggests that a dominant referent may exist within a group, and also suggests that not all firms are referents for all other firms within the group. Clarification of the referent role and relationships among firms in groups and the role these referents have regarding group- or firm-level conduct is needed. A second contribution to strategic group research is the potential existence of boundary spanning firms. Further research may reveal that these firms are, indeed, in two different groups, or are transitioning from one group to another. Strategic group research has historically focused at the group level, typically considering conduct within groups as unimportant. Moving towards a consideration of the firm-level behaviors within group would help to clarify firm-to-group transition and its antecedents. A better understanding of group-level and firm-level interaction may also serve to guide research into a clarification of the influence between the strategic group and performance relationship.

Finally, the inclusion of international companies operating in the U.S. market of the focal industry makes an important contribution to the CIP model. The non-response of firms in predominantly U.S. firm-comprised groups to the actions of foreign firm-comprised groups suggests that there may be other structural factors, which would enter the CIP model as elements of the

competitive environment, that influence the interaction between domestic and foreign firms operating in the domestic market of the focal industry.

Contributions to Managers

Most strategic group studies have been conducted to examine the relationship between groups and performance, with little attention to the conduct, or behavior, of firms within groups. This is slowly changing, as recent studies suggest (Baum & Korn, 1996). Strategic group studies have suggested few contributions to managers. As strategic group studies further investigate the relationships between the group construct and manifestations of conduct, or behavior, such as response lag, the construct may become more relevant to practicing managers. This study suggests an association between group membership and conduct. An emerging understanding of this relationship may better help managers realize the potential constraints of their cognitive schema, decision outcomes, and resulting group structures on their actions and responses in the competitive arena.

Response lag has been shown to be related to performance (Chen & Hambrick, 1995). In prior studies the determinants of response lag have been represented by organizational variables, such as organizational slack, size, and external orientation (Smith, Grimm & Gannon, 1992). The present study indicates that industry structure, in terms of strategic groups, is also associated with response lag. Thus, while it may benefit the organization to drive response lag down to zero, only a portion of the determinants may be directly influenced by managerial discretion. The strategic groupings in the industry, as a determinant

of response lag, are only slowly altered by managerial decision, as evidenced by group stability over time. This factor renders the effects of the strategic group persistent over a time period.

This study also lends support to the contention made by Feigenbaum and Thomas (1994) that group actions reinforce group norms, as members are more likely to respond to members and more likely to match in-group actions. Managers must question, however, the appropriateness of matching actions within the action/response context. Is a matching response taken because it is the most expedient course, or would a non-matching action be more appropriate? In this decision, the cost of the response lag, in terms of potential market share and credibility, needs to be weighed with the potential costs and benefits of "pushing the envelope" of the firm's capabilities to formulate a non-matching response. Can every response to a group action be non-matching? Perhaps not. But, managers should realize that some degree of their response discretion is bound by the past actions and decisions which, over time, have given rise to the group structure of their industries. An understanding of the influences of group structure may provide managers clearer insight on when it may be more beneficial to "go with the flow" or buck the trend.

What about non-matching response to out-group actions? A non-matching response may be appropriate in the initial stages of out-group response, to communicate to the out-group firm(s) that the action will not go uncontested. However, at some point the managers of responding firms must

assess the limitation of their capabilities and either cede to the incursion of the out-group, or invest in extending/increasing the capabilities of the firm.

FUTURE RESEARCH

The current study could not assess the direct association between strategic group membership and awareness, motivation and capability. This assessment was not within the intention, scope or design of the study. The present research achieved its goal: identifying the influence of the strategic group on the CIP model due to its nature as a proxy for homophily. Had this equivalence not existed, there would be no basis for determining the relationship between the strategic group, awareness, motivation, and capability. With the apparent equivalence of the strategic group construct and the homohily construct established, the investigation of the relationships with and the direct influence of the strategic group on awareness, motivation and capability is warranted. Studies in this vein would allow for a better understanding of how firms view, understand, and process information exchange, in terms of competitive interactions, with in-group firms and out-group firms. Why, for example, the apparent inverted U-shaped relationship between mobility barrier hieght and response lag. Is this the result of managerial discretion or a manifestation of determinism, an old and on-going debate in organizational science (Hrebiniak & Snow, 1985).

Direct assessment of the relationship between the strategic group and awareness for example, would allow for the theory base resulting from studies in environmental scanning to be applied. We would expect that in-group firms would be more salient to a potential responder than out-group firms and, due to this saliency, be more frequently scanned for information (Boyd & Fulk, 1994).

But this type of environmental scanning research has not been conducted at the strategic group level. Direct assessment of the relationship between awareness, motivation, and capability and the strategic group construct would also allow for an analysis of the sense-making and decision-making processes at work and the potential influence, if any, of the strategic group. There is preliminary evidence (Feigenbaum & Thomas, 1994) that firms reinforce group conduct. Closer investigation of the sensemaking process within the CIP framework and group influence would probe this preliminary finding.

The suggestion brought out in the discussion of the study findings that awareness and capability may interact to influence the decision type (i.e., programmed, non-programmed) made by the firm is an interesting one. This potential interaction between awareness, capability, group membership and decision type underscores the interactive nature of the structural and cognitive aspects of organizational science and deserves to be addressed. For example, under what conditions are programmed versus non-programmed decisions applied to responses to actions, both in-group and out-group? Does the composition of the upper echelon (the top-management team) mediate the relationship between actor, responder, group membership and the most likely decision type applied?

Another area of investigation further probes the relationship between response lag and mobility barrier height. First, is this finding in the focal industry constrained by economic factors (i.e., recession) of the early 1990's from which the data were taken? Second, is this finding generalizable to other industries?

Third, does this relationship hold over a longer period of time, or is it a dynamic one that may change over a long period of time, as cognitive schemas, business-level strategies, top management teams, and industry conditions change? Regardless, the present findings suggest that we question our understanding of the role of mobility barriers in strategic group research and also question the justification of the relative conceptual equivalence between strategic distance and mobility barries, as operationalized by the Euclidean distance resulting from cluster analysis.

SUMMARY

This study bridged the Communication-Information Processing Model of Competitive Interaction and the strategic group literature of Strategic Management. The CIP model presents communication-information theory as a means of modeling, analyzing, and understanding competition among firms in an industry. This is a comparatively new theoretical approach in Strategic Management, beginning in the mid-1980s. The strategic group literature takes its root in Bain (1956). The groups present within industries are purported to result from the choices top-level managers make regarding their firm's strategic profile, asset base, product/market scope, and resource allocations. These choices constrain future decisions.

From the intersection of these two streams of research hypotheses were developed and tested. The empirical results suggest that strategic groups may have an influence on the response dynamics of competitive interaction, more specifically, that firms are more likely to respond, and respond more quickly, to within-group actions than to actions from outside the group.

References

Aldenderfer, M. S., & Blashfield, R. K. 1988. ***Cluster analysis.*** Newberry Park, CA: Sage.

Aldrich, H. E. 1979. ***Organizations and environments.*** Englewood, Cliffs, NJ: Prentice-Hall.

Bain, J. S. 1956. ***Barriers to new competition.*** Cambridge, MA: Harvard University Press.

Barney, J. B. 1991. Firm resources and sustained competitive advantage. ***Journal of Management,*** 17: 99-100.

Barney, J. B., & Hoskisson, R. E. 1990. Strategic groups: Untested assertions and research proposals. ***Managerial and Decision Economics,*** 11: 187-198.

Baum, J. A., & Korn, H. J. 1996. Competitive dynamics of interfirm rivalry. ***Academy of Management Journal,*** 39: 255-291.

Bettis, R. A., & Weeks, D. 1987. Financial returns and strategic interaction: The case of instant photography. ***Strategic Management Journal,*** 8: 549-563.

Boeker, W. C. 1991. Organizational strategy: An organizational perspective. ***Academy of Management Journal,*** 34: 613-635.

Bogner, W. C. , & Thomas, H. 1993. The role of competitive groups in strategy formulation: A dynamic integration of two competing models. ***Journal of Management Studies,*** 30: 51-67.

Bogner, W. C., Pandian, J. R. & Thomas, H. 1994. The firm-specific aspects of strategic group dynamics. In H. Daems & H. Thomas (Eds.), ***Strategic groups, strategic moves and performance.*** New York: Pergamon.

Bourgeois, L. J. 1980. Strategy and environment: A conceptual integration. ***Academy of Management Review,*** 5: 25-33.

Bourgeois, L. J. III, & Eisenhardt, K. M. 1988. Strategic decision processes in high velocity environments. ***Management Science,*** 34: 816-836.

Boyd, B. K., & Fulk, J. 1996. Executive scanning and perceived uncertainty: A multi-dimensional model. ***Journal of Management,*** 22: 1-21.

Burt, R. S. 1987. Social contagion and innovation: Cohesion versus structural equivalence. ***American Journal of Sociology,*** 92: 1287-1335.

Caves, R. E., & Porter, M. E. 1977. From entry barriers to mobility barriers: Conjectural decisions and contrived deterrence to new competition. ***Quarterly Journal of Economics,*** 91: 241-261.

Caves, R. E. 1984. Economic analysis and the quest for competitive advantage. ***Papers and Proceeding of the 96th Annual Meeting of the American Economic Association,*** May: 127-132.

Chen, M. J. 1988. ***Competitive strategic interaction: A study of competitive actions and responses.*** Unpublished doctoral dissertation, University of Maryland.

Chen, M. J. 1996. Competitor analysis and interfirm rivalry: Toward a theoretical integration. ***Academy of Management Review,*** 21: 100-134.

Chen, M. J., & Hambrick, D. 1995. Speed, stealth, and selective attack: How small firms differ from larger competitors. ***Academy of Management Journal,*** 38: 453-467.

Chen, M., & MacMillan, I. C. 1992. Nonresponse and delayed response to competitive moves: The role of competitor dependence and action irreversibility. ***Academy of Management Journal,*** 35: 539-570.

Chen, M., & Miller, D. 1994. Competitive attack, retaliation and performance: An expectancy-valence framework. ***Strategic Management Journal,*** 15: 85-102.

Chen, M., Smith, K. G. & Grimm, C. M. 1992. Action characteristics as predictors of competitive responses. ***Management Science,*** 38: 439-455.

Cool, K. 1985. ***Strategic groups formulation and strategic group shift: A longitudinal analysis of the U.S. pharmaceutical industry, 1963-1982.*** Unpublished doctoral dissertation, Purdue University, West Lafayette, Ind.

Cool, K., & Dierickx, I. 1993. Rivalry, strategic groups and firm profitability. ***Strategic Management Journal,*** 14: 47-59.

Cool, K. & Schendel, D. 1988. Performance differences among strategic group members. ***Strategic Management Journal,*** 14: 47-59.

Daems, H. & Thomas, H. (Eds.). 1994. ***Strategic groups, strategic moves and performance.*** New York: Pergamon.

Daft, R. L., & Weick, K. E. 1984. Toward a model of organizations as interpretation systems. ***Academy of Management Review,*** 9: 284-295.

Day, D. L., Lewin, A. Y., & Hongyu, L. 1995. Strategic leaders or strategic groups: A longitudinal data envelopment analysis of the U. S. brewing industry. ***European Journal of Operational Research,*** 80: 619-639.

Dierickx, I., & Cool, K. 1994. Competitive strategy, asset accumulation and firm performance. In H. Daems & H. Thomas (Eds.), ***Strategic groups, strategic moves and performance.*** New York: Pergamon.

DiMaggio, P. J., & Powell, W. W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. ***American Sociological Review,*** 48: 147-160.

Dranove, D., Peteraf, M., & Shanley, M. 1998. Do strategic groups exist? An economic framework for analysis. ***Strategic Management Journal,*** 19: 1029-1044.

Dutton, J. & Jackson, S. 1987. Categorizing strategic issues: Links to organizational action. ***Academy of Management Review,*** 10: 287-295.

Duysters, G. & Hagedorn, J. 1995. Strategic groups and inter-firm networks in international high-tech industries. ***Journal of Management Studies,*** 32: 359-381.

Eaton, B. C., & Lipsey, R. G. 1975. The principle of minimum differentiation reconsidered: Some new developments in the theory of spatial competition. ***Review of Economic Studies,*** 42: 27-49.

Eisenhardt, K. 1989. Making fast strategic decisions in high-velocity environments. ***Academy of Management Journal,*** 32: 543-576.

Fahey, L., & Narayanan, V. K. 1986. ***Macroenvironmental analysis for strategic management.*** St. Paul: West Publishing.

Feigenbaum, A., Hart, S., & Schendel, D. 1996. Strategic reference point theory. ***Strategic Management Journal,*** 17: 219-235.

Feigenbaum, A., McGee, J., & Thomas, H. 1987. Exploring the link between strategic groups and competitive strategy. ***International Studies of Management and Organization,*** 18: 6-25.

Feigenbaum, A., & Thomas, H. 1994. The concept of strategic groups as reference models: An adaptive model and empirical test. In H. Daems &

H. Thomas (Eds.), ***Strategic groups, strategic moves and performance.*** New York: Pergamon.

Feigenbaum, A., & Thomas, H. 1993. Industry and strategic group dynamics: Competitive strategy in the insurance industry, 1970-1984. ***Journal of Management Studies,*** 30: 69-105.

Feigenbaum, A., & Thomas, H. 1990. Strategic groups and performance: The U. S. insurance industry, 1970-1984. ***Strategic Management Journal,*** 11: 197-215.

Fombrun. C. J., & Zajac, E. J. 1987. Structural and perceptual influences on intra-industry stratification. ***Academy of Management Journal,*** 30: 33-50.

Galbraith, J. K. 1973. ***Designing complex organizations.*** Reading, MA: Addison-Wesley.

Ghemawat, P. 1991. ***Commitment: The dynamic of strategy.*** New York: Free Press.

Gollop, F., & Roberts, M. 1979. Firm interdependence in oligopolistic markets. ***Journal of Economietrics,*** 10: 313-331.

Hambrick, D. C., Geletkanycz, M. A., & Frederickson, J. W. 1993. Top executive commitment to the status quo: Some tests of its determinants. ***Strategic Management Journal,*** 14: 401-418.

Hambrick, D. C., & Mason, P. A. 1984. Upper echelons: The organization as a reflection of its top manager. ***Academy of Management Review,*** 9: 193-206.

Hannan, M., & Freeman, J. 1977. The population ecology of organizations. ***American Journal of Sociology,*** 83: 929-964.

Harrigan, K. R. 1985. An application of clustering for strategic group analysis. ***Strategic Management Journal,*** 6: 55-73.

Harrigan, K. R. 1980. ***Strategies for declining businesses.*** Lexington, MA: Lexington Books.

Hatten, K. J., & Hatten, M. L. 1987. Strategic groups, asymmetrical mobility barriers and contestability. ***Strategic Management Journal,*** 8: 329-342.

Heil, O., & Robertson, T. S. 1991. Toward a theory of competitive market signaling: A research agenda. ***Strategic Management Journal,*** 12: 403-418.

Henderson, B. D., 1983. The anatomy of competition. ***Journal of Marketing,*** 47: 7-11.

Henderson J. C., & Nutt, P. C. 1980. The influence of decision style on decision making behavior. ***Management Science,*** 26 (4): 371-377.

Hergert, M. 1987. Causes and consequences of strategic groupings in U. S. manufacturing industries. ***International Studies of Management and Organizations***, 18(1): 26-49.

Hofer, C., & Schendel, D. 1978. ***Strategy formulation: Analytical concepts.*** St. Paul: West Publishing Company.

Hotelling, H. 1929. Stability in competition. ***Economic Journal,*** 39: 41-57.

Hunt, M. S. 1972. ***Competition in the major home appliance industry, 1960-1970.*** Unpublished doctoral dissertation, Harvard University.

Kiesler, S., & Sproull, L. 1982. Managerial response to changing environments: Perspectives on problem sensing from social cognition. ***Administrative Science Quaterly,*** 27: 548-570.

Lawrence, P. R., & Lorsch, J. W. 1967. ***Organization and environment.*** Homewood, IL: Irwin.

Lieberman, M. B., & Montgomery, D. B. 1988. First-mover advantages. ***Strategic Management Journal,*** 9: 41-58.

Mascarenhas, B. 1989. Strategic Group Dynamics. ***Academy of Management Journal,*** 32: 333-352.

Mascarenhas, B., & Aaker, D. 1989. Mobility barriers and strategic groups. ***Strategic Management Journal,*** 10: 475-485.

McGee, J. & Thomas, H. 1986. Strategic groups: A useful linkage between industry structure and strategic management, ***Strategic Management Journal,*** 7(2): 141-160.

McGee, J., & Thomas, H. 1989. Research notes and communications: Strategic groups - a further comment. ***Strategic Management Journal,*** 10: 105-107.

Miles, R. E., & Snow, C. C. 1978. ***Organizational strategy, structure, and process.*** New York: McGraw-Hill.

Nohria, N., & Garcia-Pont, C. 1991. Global strategic linkages and industry structure. ***Strategic Management Journal,*** 12 (Summer): 105-125.

Peteraf, M. A. 1993a. The cornerstones of competitive strategy: A resource-based view. ***Strategic Management Journal,*** 14: 179-191.

Peteraf, M. A. 1993b. Intra-industry structure and the response toward rivals. ***Managerial and Decision Economincs,*** 14: 519-528.

Peteraf, M. A., & Shanley, M. 1997. Getting to know you: A theory of strategic group identity. ***Strategic Management Journal,*** 18 (Special Issue): 156-186.

Pfeffer, J., & Salancik, G. R. 1978. ***The external control of organizations: A resource dependence perspective.*** New York: Harper & Row.

Porac, J., & Thomas, H. 1990. Taxonomic mental models in competitor definition. ***Academy of Management Review,*** 15: 224-240.

Porac, J., Thomas, H., & Baden-Fuller, C. 1989. Competitive groups as cognitive communities: The case of the Scottish knitwear manufacturers. ***Journal of Management Studies,*** 15: 397-416.

Porter, M. E. 1979. The structure within industries and company performance. ***Review of Economics and Statistics,*** 61: 214-227.

Porter, M. E. 1980. ***Competitive strategy.*** New York: Free Press.

Porter, M. E. 1985. ***Competitive advantage.*** New York: Free Press.

Powell, T. C. 1992. Organizational alignment as competitive advantage. ***Strategic Management Journal,*** 13: 119-134.

Reed, R., & DeFillippi, R. J. 1990. Causal ambiguity, barriers to imitation and sustainable competitive advantage. ***Academy of Management Review,*** 15: 88-102.

Reger, R. K., & Huff, A. S. 1993. Strategic groups: A cognitive perspective. ***Strategic Management Journal,*** 14: 103-124.

Sharma, S. 1996. ***Applied multivariate techniques.*** New York: J. Wiley.

Schwenk, C. 1984. Cognitive simplification processes in strategic decision making. ***Strategic Management Journal,*** 5: 111-128.

Smith, K. G., & Grimm, C. M. 1991. A communication/information processing model of competitive response timing. ***Journal of Management,*** 17(1): 5-23.

Smith, K. G., Grimm, C. M., & Chen, M. J. 1989. Predictors of response time to competitive strategic actions: Preliminary theory and evidence. ***Journal of Business Research,*** 18: 245-258.

Smith, K. G., Grimm, C. M., & Gannon, M. J. 1990. Competitive moves and responses among high-technology firms. In H. E. Glass (Ed.), ***Handbook of business strategy.*** Boston: Warren, Gorham, & Lamont.

Smith, K. G., Grimm, C. M., & Gannon, M. J. 1992. ***Dynamics of competitive strategy.*** Newberry Park, CA: Sage.

Smith, K. G., Grimm, C. M., Gannon, M. J., & Chen, M. J. 1991. Organizational information processing, competitive responses, and performance in the U.S. domestic airline industry. ***Academy of Management Journal,*** 34: 60-85.

Spender, J. C. 1989. ***Industry recipes.*** Oxford: Blackwell.

Spender, J. C. 1992. Strategy theorizing. ***Advances in Strategic Management,*** 8: 2-32.

Sudharshan, D., Thomas, H., & Feigenbaum, A. 1991. Assessing mobility barriers in dynamic strategic groups analysis. ***Journal of Management Studies,*** 28(5): 429-439.

Tang, M., & Thomas, H. 1992 . The concept of strategic groups: Theoretical construct of analytical convenience. ***Managerial and Decision Economics,*** 13: 323-329.

Thomas, H., & Venkatramen, N. 1988. Research progress on strategic groups: Progress and prognosis. ***Journal of Management Studies,*** 25(6): 537-549.

Weick, K. E. 1979. ***The social psychology of organizations.*** Reading, MA: Addison-Wesley.

White, H. C. 1981. Where do markets come from? ***American Journal of Sociology,*** 87: 517-547.

Zajac, E. J., & Bazerman, M. H. 1991. Blind spots in industry and competitor analysis: Implications of interfirm (mis)perceptions for strategic decisions. ***Academy of Management Review,*** 16: 37-56.

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B.A., May 1981, Albion College, majors: Economics/Management, French; minor: Sciences

Teaching Interests: Strategic Management, Principles of Management, International Business,Entrepreneurship

Research Interests: Business Strategy in both domestic and international contexts
International business issues affecting organizations
Entrepreneurship and small business management, e-commerce

Teaching:

Department of Management, Old Dominion University (1991- 1997)
Principles of Management, International Business, Comparative Management, Business Policy & Strategy

Tidewater Tech, Norfolk, Virginia (1996)
Computer Concepts, Introduction to Windows, Wordprocessing I & II, Database Management

Academic Services, Old Dominion University (1996-1997)
Tutored at-risk students in several business subjects, economics, and statistics

IMAGE EVALUATION TEST TARGET (QA-3)

150mm

6"

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