PARADIGM SHIFT:
THE PARALLEL ORIGIN, EVOLUTION, AND FUNCTION OF STRATEGIC GROUP ANALYSIS WITH THE RESOURCE-BASED THEORY OF THE FIRM

William C. Bogner, Joseph T. Mahoney, and Howard Thomas

ABSTRACT

We demonstrate that the strategic group concept has underlying parallels with the resource-based concept of the firm as a collection of resources. In particular, there is correspondence between the two concepts in terms of their origin, evolution, and function. Further, both the resource-based and strategic group literatures are moving toward an increased emphasis on multi-disciplinary economic, behavioral, and cognitive research. These trends in the resource-based and strategic group debates reflect a larger paradigm shift in strategic management that is moving both strands of the literature toward a knowledge integration of economic, behavioral, and cognitive perspectives.

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INTRODUCTION

McGee and Thomas note that, "strategic group analysis has interesting parallels with the theory of the growth of the firm as first articulated by Downie (1958), Penrose (1959), and Marris (1964) more than twenty years ago" (1986, p. 157). While McGee and Thomas (1986) suggest important links between strategic group analysis and resource-based analysis, we clarify how these perspectives are connected historically and how they underpin contemporary views of strategic management. In particular, we show that the strategic group concept and the concept of the firm as a "collection of resources" (Penrose, 1959) have parallels in terms of their origin, evolution, and function. Based on these commonalities, we argue that it is only through a multi-disciplinary consideration of firm-specific and multiple-firm views that dynamic and cognitively-driven perspectives of strategic management can be grounded. Indeed, just such an approach to strategy research is now in progress (Barney & Zajac, 1994; Bowman, 1990).

Through consideration of origin, evolution, and function, we not only clarify theoretical concepts but also provide insight for connecting the strategic group concept with the concept of the firm as a collection of resources (e.g., human, physical, relational, and intellectual). Indeed, some social scientists argue that any full explanation of concepts requires attention to their origin, evolution, and function (Elster, 1983; Langlois, 1986). Such a full explanation enables us to connect the historical arguments with current research goals, such as understanding how firms achieve sustainable competitive advantage (Rumelt, Schendel, & Teece, 1994; Williams, 1992). The documentation of these connections also demonstrates the cumulative efforts and the continuity of the evolving strategic management literature.

In this paper we explore the *economic* origin, evolution, and function of strategic group analysis with the resource-based theory of the firm. We also note how cognitive research has informed strategic management in the 1980s and 1990s. In order to keep the paper manageable, we do not discuss the origin, evolution and function of managerial and organizational cognition literatures. Certainly contributions in this area would include Simon (1947), March and Simon (1958), and Weick (1979), along with developments in the new institutionalism (DiMaggio & Powell, 1983; Lant & Baum, 1995; Meyer & Royan, 1977; Zucker, 1977). Oliver (1997) provides a process model that combines the insights of a resource-based view with the institutional perspective from organization theory. Patterns of inquiry within strategic management are moving toward a synthesis of economic, behavioral, and cognitive research—an approach advocated by Barney (1992), Nonaka (1994), Porac and Thomas (1990), and Zajac (1992), among others—and this synthesis captures (and requires) both the resource-based and strategic group concepts.

COMMON ORIGINS OF THE STRATEGIC GROUP AND RESOURCE-BASED CONCEPTS

Here we provide evidence for a singular point: both the strategic group concept and the resource-based concept have origins in the economics discipline that were motivated by dissatisfaction with industrial organization economics and Marshallian (neoclassical) microeconomics.

Origins of the Strategic Group Concept

The structure-conduct-performance (S-C-P) approach deserves the designation of a paradigm. Originating in the Harvard School of industrial economics (Bain, 1956, 1968; Mason, 1957), the S-C-P paradigm posits a causal relationship wherein an exogenous industry structure determines firm strategy or "conduct," which, in turn, determines performance. Industry structure variables include: number of sellers and buyers, barriers to entry, and cost structures. Strategic or conduct variables include: pricing behavior, product strategy, advertising, research and innovation, plant investment, and legal tactics. Performance variables include: production and allocative efficiency, technological progress, full employment, and distributional equity. However, contrary to the belief of some in strategic management (Porter, 1991), the Harvard School was not the only belief system in industrial organization that informed the emerging field of strategy.

In the 1950s the Chicago School of industrial organization began to raise doubts about the S-C-P paradigm. By the 1960s and early 1970s this revisionist Chicago School (Stigler, 1968), with its emphasis on applied price theory, gradually gained the upper hand in industrial organization (I.O.) research and developed a new theoretical perspective (Demsetz, 1974). Specifically, the followers of this tradition did not impute anti-competitive purposes to complex or unfamiliar business practices. Instead, the principal managerial objective posited is profit maximization achieved primarily through (cost-saving) efficiencies (Coase, 1937, 1960). The implicit role of the individual manager in this efficiency view would become one of strategic management's explicit points of departure from the Harvard S-C-P view.

The industrial organization debate led to some polarization between these "two systems of belief" (Demsetz, 1974). However, some I.O. groups, such as the University of Pennsylvania in the 1970s did maintain a balance (see, Phillips, 1970; Williamson, 1986, 1996). Nonetheless, by the mid-1970s the S-C-P paradigm of the Harvard School was under large-scale attack (Demsetz, 1973; Mancke, 1974; Phillips, 1970). Hunt's (1972) observation of persistent, strategic, firm-level heterogeneity in the home appliance industry provided empirical support and motivation for the development of the strategic group concept. By combining structural and strategic (behavioral) variables, Caves and Porter (1977) and Porter (1976, 1979) attempted to rescue the S-C-P view. Therefore, the initial strategic group

concept may be understood as an adaptive response by Harvard School industrial organization economists to the growing dissatisfaction with the S-C-P paradigm.

Origins of the Resource-based Concept

While the 1950s witnessed the initial departures from Harvard's structure-conduct-performance paradigm, it also witnessed some departures from neoclassical microeconomics. Just as the strategic group concept was motivated by the growing dissatisfaction with the S-C-P paradigm of I.O. economics, the resource-based concept had a parallel origin. Resource-based theory emerged from a dissatisfaction with neoclassical economic's handling of real-world problems of the firm that were outside of an equilibrium context. Boulding captured this discrepancy referring to the neoclassical firm as "a strange bloodless creature without a balance sheet, without any visible capital structure, without debts, and engaged apparently in the simultaneous purchase of inputs and sales of outputs at constant rates" (1950, p. 34).

In the midst of this growing dissatisfaction with neoclassical economics, Edith Tilton Penrose provided a new conceptual schema for the firm as "both an administrative organization and as a collection of resources" (1959, p. 31). Penrose noted that the neoclassical theory of the firm is a conceptual schema designed for the theory of price determination and resource allocation but insisted that it is "inappropriate to try to reconcile (the neoclassical theory of the firm) with 'organization theory'" (1959, p. 14). In particular, Penrose (1959) makes explicit that the resource-based perspective is a distinct conceptual schema for the purpose of understanding firm-level growth. Therefore, the resource-based concept of the firm as a collection of resources can be understood as a response to the inadequacies of microeconomics for dealing with dynamic growth processes of the firm.

While economists were instrumental in the origination and the evolution of both the resource-based and strategic group concepts, for the most part the subsequent development, refinement, and use of these concepts have taken place in strategic management. In fact, of the three leading textbooks in industrial organization economics (Carlton & Perloff, 1990; Scherer & Ross, 1990; Tirole, 1988), only Scherer and Ross (1990) discuss both Penrose's (1959) resource-based concept and the strategic group concept. Thus, while we highlight here the origin of the strategic group and resource-based concepts in economics, we now shift to strategic management to highlight the subsequent contributions.

THE EVOLUTION AND FUNCTION OF THE STRATEGIC GROUP CONCEPT

As the debate about the stylized S-C-P paradigm continued in industrial organization economics in the mid-1970s, the field of Strategy began to emerge as a sepa-

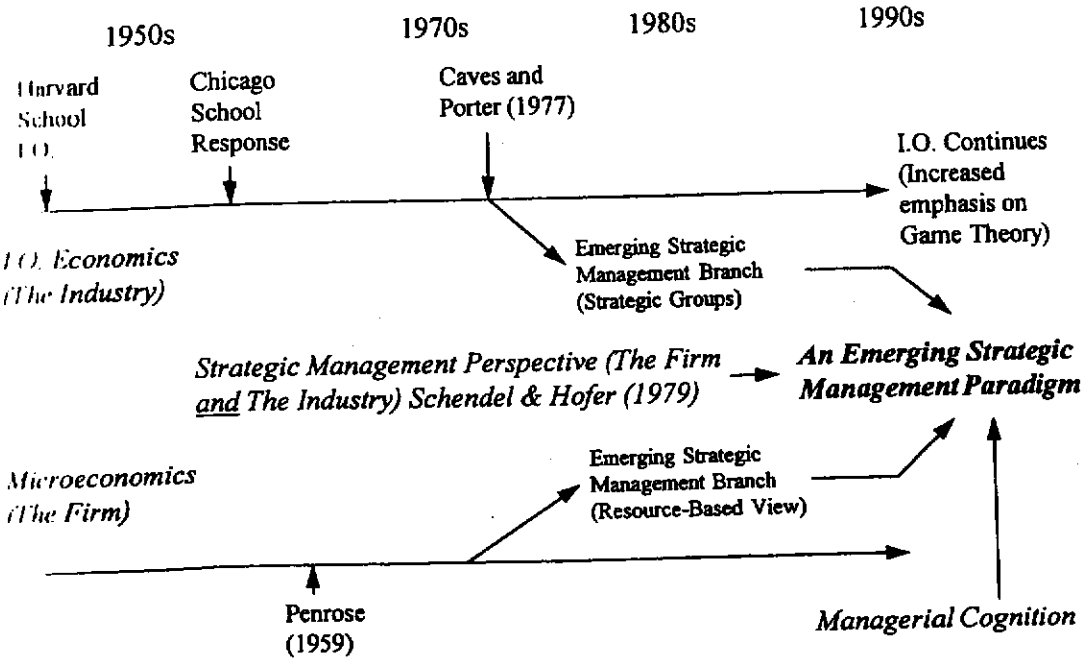

Figure 1. The evolution and integration of concepts.

rate discipline. Indeed, Porter (1980), following Phillips (1970), essentially rewrote the structure-conduct-performance causal chain as conduct (strategy)-structure-performance. Porter (1980, p. 129) also proposed the strategic group concept for explaining and predicting firm conduct and performance. Porter's (1980) perspective represents an evolutionary change of S-C-P concepts since Mason (1957) and Bain (1968), and marks the beginning of an identifiable paradigm shift in industry and strategic group analysis away from I.O. and toward a uniquely strategic management perspective, as captured in Figure 1.

The two streams of strategic group research are illustrated by the way in which groups are derived. Working from the S-C-P paradigm, Porter (1980) begins with the industry as the basic unit of analysis and then moves to a more disaggregate unit of analysis—the strategic group. Many strategic management researchers take the firm as the basic unit of analysis (Rumelt, 1984, 1991) and then aggregate firms into strategic groups (Cool & Schendel, 1988; Fiegenbaum & Thomas, 1993; Hatten & Schendel, 1977).[1] Distinctive research methodologies parallel the conceptual differences.[2]

There remains a perception among some in organization science that strategy researchers adhere strictly to the Harvard I.O. view (Porter, 1991). However, strategic group analysis enables strategists to simultaneously capture patterns of emergent firm-level strategies across an industry (Bogner, Thomas, & McGee, 1996) and to isolate firm-level interactions among close rivals (Cool, 1985). These ideas developed in strategic management have taken strategic groups beyond their industrial organization roots.

In the evolution of the strategic group concept in strategic management several questions about groups have been considered. In answering these questions from a strategic management perspective, researchers are pushing the strategic group concept toward an emerging synthesis with the resource-based theory. The following questions have been particularly important in this process: (1) How does strategic group membership change over time?; (2) Does a firm's performance depend upon strategic group membership?; and (3) How do strategic groups emerge? (Barney & Hoskisson, 1990; Bogner & Thomas, 1993; McGee & Thomas, 1989; Tang & Thomas, 1992; Thomas & Venkatraman, 1988). In the process of discussing these questions we address Barney and Hoskisson's (1990) concerns on the very existence of strategic groups.

How Do Firms Change Strategic Group Membership?

In strategic management the strategic group concept has evolved from a static to a dynamic concept (Cool, 1985; Hatten, Schendel, & Cooper, 1978). This research on dynamics illustrates temporal periods of group stability broken by exogenous discontinuities and member firms' active attempts at Schumpeterian "creative destruction" (Cool & Schendel, 1987; Fiegenbaum, Sudharshan, & Thomas, 1987). These dynamic perspectives employ changes in the competitive environment and alert responses by firms to suggest a long-term pattern of group formation, rivalry, and repositioning (Fiegenbaum, Sudharshan, & Thomas, 1990).

The research on dynamics shows how strategic groups capture patterns of firm-specific differences. Strategic groups are defined by the similar past resource commitments of their members, and it is precisely these (sunk cost) commitments that lead to their differential response to environmental change. Clustering captures similar (but not identical) firm-based resource accumulation and deployment (Bogner, Pandian, & Thomas 1994).

Firm Performance Due To Strategic Group Membership

Expectations concerning firm-level performance represent another area where the strategy perspective has moved away from the S-C-P paradigm in I.O. (Mascarenhas & Aaker, 1989). The I.O. view of deterministic managerial behavior is replaced by the strategic choice perspective (Robins, 1992). Firm performance can vary widely within each group due to the general managers' various abilities to develop resources and to exploit opportunities in competition. Thus, firm profit rates are a function of two components, namely, the skills of the firm's management in exploiting competitive opportunities and the intensity of rivalry among firms (Porter, 1980; Wijnberg, 1995). The general strategies of the group per se are not the sole basis of firm profitability and profit differences between groups need not exist (Bogner, 1991; Hallagan & Joerding, 1983; Nayyar, 1989; Smith, Grimm, Wally, & Young, 1997).

On the other hand, strategic group membership affects profit rates if there exist mobility barriers based on sunk cost investments and if there is imperfectly competitive oligopolistic conduct (Dranove, Peteraf, & Shanley, 1993). Mobility barriers include: capital intensity (Hatten & Schendel, 1977), vertical integration (Newman, 1978), control of distribution channels (Dess & Davis, 1984), advertising intensity (Oster, 1982), R&D stocks and flows (Cool & Schendel, 1987), and scope commitments (Fiegenbaum & Thomas, 1993). It is important to emphasize that while these various sunk cost investments (commitments) may be a key concept for explaining the persistence of rents ex post, it may be a grave mistake to suggest that firm rents can be expected ex ante from sunk cost commitments. Peteraf notes that: "In deciding upon the optimum level of commitment, managers must weigh the value of sustainability, or the possibility of losing its position to other players, against the value of flexibility" (1993a, p. 578).

Strategic group structure may influence conditions of rivalry and hence, firm performance (Cool & Dierickx, 1993; Ketchen et al., 1997). While under certain demand conditions, collusive conduct in combination with sunk cost investments are sufficient for superior performance by strategic group members, explicit oligopolistic collusion is not necessary for sustaining superior strategic group profitability. The sustainability of strategic group profitability does not necessarily derive from the strategic intent of group members. Here our argument is a derivative of the work of both Hayek (1978) and Mintzberg (1978). To be sure, a mobility barrier is a collective good for strategic group members (Caves & Ghemawat, 1992), but such a collective good can be maintained without explicit collective coordination. Moreover, under certain competitive scenarios, one would not expect performance differences across groups—the so-called polymorphic equilibrium (Hallagan & Joerding, 1983). Still further, under conditions of uncertain imitability due to causal ambiguity (Lippman & Rumelt, 1982) performance differences and rivalry may be higher within strategic groups than across strategic groups. Therefore, under certain conditions the strategic group concept can help explain sustainable competitive advantage, but sustainable competitive advantage is neither a necessary nor a sufficient condition of strategic group structure.

How Do Strategic Groups Emerge?

While the development of frameworks for capturing strategic group dynamics and the development of models to provide the necessary and sufficient conditions for strategic group effects on performance are current areas of activity in strategy, these do not explain how strategic groups form. Indeed, Barney and Hoskisson (1990), Hatten and Hatten (1987) and others, challenge the very idea that strategic groups exist. The explanations for the existence of strategic groups include economic, behavioral, and cognitive approaches (Tang & Thomas, 1992; Thomas & Carroll, 1994).

The Economic and Behavioral Dimensions of Strategic Group Formation

In the strategic management approach, a strategic group is defined as: "A set of firms competing within an industry on the basis of similar combinations of scope and resource commitments" (Cool & Schendel, 1987, p. 1106). Strategic investments are at the core of strategic group formation (Cool & Schendel, 1988; Fiegenbaum, McGee, & Thomas, 1987). Resources, including information resources and technologies (Duysters & Hagedoorn, 1995; Powell & Dent-Micallef, 1997; Segars & Grover, 1994), are acquired and developed in a path-dependent process (Arthur, 1989) and investments are often made to develop (or overcome) factor market imperfections and isolating mechanisms (Lippman & Rumelt, 1982). Firms making similar investments develop similar, but not identical, stocks of competitive resources; they pursue similar customers and environmental opportunities in similar ways (Kim & Lim, 1988; Tallman, 1991). Thus, similar firms form strategic groups.

As industries evolve, different groups of firms emerge as firms take advantage of new consumer demands or fill gaps in the product space. Consistent with the resource-based theory discussed below, this view of strategic group formation considers a firm's behavior in (domestic and global) competition as both facilitated by, and constrained by, the firm's prior resource commitments (Carr, 1993; Chi, 1994; Collis, 1994; Collis & Montgomery, 1995; Mehra, 1996). Hence, strategic groups capture both the opportunities and limitations that a firm has in the future due to both past firm-level asset stock accumulation (Dierickx & Cool, 1989) and the viable competitive alternatives available in an industry competing for the future (McGee, 1985; McGee & Thomas, 1986). Different time paths of the resource flows needed to adjust asset stocks to desired levels lead to within-group differences in both strategy and subsequent profitability (Cool, Dierickx, & Martens, 1994).

This firm-level analysis of similar resource commitments in strategic management provides a contrast to the collusive view of mobility barrier creation held in traditional I.O. While strategic groups may result from explicit collusion among its members that is enforced by mutual threats (Shapiro, 1989; Tirole, 1988), the strategic management view suggests that they can arise from "emergent patterns" (e.g., patterns of individual resource commitments), not necessarily as the result of explicit collective group coordination. For example, concepts such as discount retailing, supermarkets, and fast-food restaurants all *emerged* as viable competitive postures or "benchmarks" (Fiegenbaum, Hart, & Schendel, 1994) in industries where they did not previously exist.

Spatial competition models further illustrate how strategic groups can emerge from the process of competition (Tang & Thomas, 1992). In fact, Zajac and Jones (1993) note that even direct intra-group competition can have a cooperative intragroup outcome. For example, Coke and Pepsi's competitive moves may have a cooperative intragroup outcome relative to other soft drink firms.

Different strategic groups represent the different sets of resource commitments of their members. Because these commitments vary among groups, mobility barriers can clearly be asymmetric with some firms blockaded from certain niches while other firms may have greater access to alternative positions in strategic space (Hatten & Hatten, 1987).

The Cognitive Dimensions of Strategic Group Formation

The addition of cognitive structures to the strategic group literature has emerged uniquely in strategic management. Huff (1982) argues that the study of common knowledge structures may enhance our understanding of strategic groups and the cognitive perspective has enriched the theory of how analytically identified groups form and why they tend to remain stable (Fiol & Huff, 1992; Grinyer & Spender, 1979; Reger & Huff, 1993; Shanley, 1993; Spender, 1989). Strategy researchers ascertain strategic groups by using frameworks of managerial cognition (Weick, 1995). Clearly, mental models or "frames" at the cognitive level become intertwined with routines at the behavioral level (Porac & Thomas, 1990). Thus, firm strategies can be considered as the interrelationship between managerial cognition (the articulable and tacit mental models of decision makers) and conduct (e.g., resource conversion activities). The cognitive approach represents a new perspective, one not derived from any of the I.O. schools, but one that is tightly linked to strategic management's roots in the decision process (Cyert & March, 1963). It is through cognition that managerial behavior becomes enacted (Ocasio, 1997; Weick, 1979). The way firms see themselves and their competitors (Porac, Thomas, & Emme, 1987) is expected to have consequences for strategic action (Porac & Rosa, 1996; Reger & Huff, 1993). Thus, to exclude the cognitive construction and its potential for different interpretations, whether by an individual manager or by a consensus of a competent top management team (Eliasson, 1990), is to revert to the deterministic S-C-P paradigm of a mechanistic manager.[3]

Recent empirical research has used a cognitive approach to identify strategic groups (Lant & Baum, 1995). The cognitive approach is utilized for discerning strategic groups in retailing (Porac & Thomas, 1994), banking and financial services (Fombrun & Zajac, 1987; Reger, 1988; Reger & Huff, 1993; Walton, 1986), the clothing industry (McNamee & McHugh, 1989) and Scottish knitwear (Porac, Thomas, & Baden-Fuller, 1989; Porac, Thomas, Wilson, Paton, & Kanfer, 1995). Managers are seen as engaging in intra-group rivalry not just because of similar supply-side characteristics among group members competing for the demand-side distribution of customers, but also because of strongly held and shared cognitive models of who competes with whom and on what competitive dimensions their competition takes place.

When these socially constructed cognitive models remain stable for a sufficient time period, then a shared set of beliefs that make up a recipe for doing business constitutes a "cognitive community" that can be identified (Porac & Thomas,

1990; Thomas & Carroll, 1994). Conversely, when members of a cognitive community deviate from others in terms of resource deployments, significant competitive responses can result (Porac, Thomas, & Baden-Fuller, 1989). This relationship between managerial cognition and behavior suggests the possibility of relating the use of cognitive models to *consequences* of the deployment of resources. For example, Barr, Stimpert, and Huff (1992) trace the changes in the cognitive maps of top managers in two railroads and the (competitive and cooperative) consequences of these cognitive maps for strategic action.

In addition to providing a managerial basis for differences in resource allocation patterns across an industry, the cognitive perspective gives further support for the importance of groups as a unit of analysis in competition. Along this line, Porac and Thomas (1990) and Reger and Huff (1993) suggest that strategists think in terms of clusters of competitors to cognitively simplify a complex environment. Managers have and use complex multidimensional classification schemes (Meyer, Tsui, & Hinings, 1993; Reger & Huff, 1993). These mental models, however formed, represent a conceptualization of strategic groups in the minds of the strategist (Boeker, 1991; Fombrun & Zajac, 1987; Huff, 1982; Pehrsson, 1990; Reger, 1990a; Reger & Palmer, 1996). For example, Reger and Huff's (1993) study of the 18 largest bank holding companies headquartered in Chicago uses personal construct theory (Kelly, 1955) and its related methodology, the repertory grid technique (Fransella & Bannister, 1977; Reger, 1990b), to demonstrate that strategic groups are readily perceived by strategists.

Reger and Huff's (1993) study, and the cognitive community research of Porac, Thomas, and Baden-Fuller (1989) and Porac et al. (1995) provide evidence that strategic groups are more than analytical conveniences. They are an important part of the way firms' strategists organize and make sense of their competitive environment. When the unique sets of resources of the firm prove to be successful, then such resource combinations are emulated in competition by cross-firm learning (Aharoni, 1993; Fiegenbaum, 1987). Strategic groups, therefore, can be viewed as both cognitive communities in which members learn and develop knowledge, and cognitive models or "knowledge structures" (Lyles & Schwenk, 1992) that can serve to define expected relationships and behaviors.

Cognitive and economic imperatives converge due to simplification and elaboration processes in categorization (Farjoun & Lai, 1997; Reger & Huff, 1993; Rosch & Mervis, 1975), as well as convergent expectations (Malmgren, 1961), social learning (Bandura, 1986) and social identification (Peteraf & Shanley, 1997). In this view, strategic groups are "structures of mutual expectation" (Weick, 1979). A strategic group acts as a reference group for group members in the process of making competitive strategy decisions (Fiegenbaum, Hart, & Schendel, 1996; Fiegenbaum & Thomas, 1994, 1995). Common sources of information (Porac, Thomas, & Emme, 1987), industry recipes (Calori, Johnson, & Sarnin, 1992, 1994; Huff, 1990; Spender, 1989), tacit knowledge (Nonaka & Takeuchi, 1995; Polanyi, 1962; Wright, 1994) and competitive and

cooperative behaviors stabilize shared cognitive models (i.e., cognitive groups). This research suggests that cognitive groups and economic-based groups interact in a circular flow.[4]

This interrelationship is predicated on the perpetual, iterative nature of the strategy formation process (Mintzberg, 1978). By placing the cognitive perspective within the dynamic economic theory of strategic groups that has emerged in strategic management, a process of managerial behavior and group dynamics emerges that employs a system of enactment at a group level (Porac, Thomas, & Baden-Fuller, 1989; Porac et al., 1995; Weick, 1995). Thus, as developed in strategic management, strategic groups can simultaneously represent both similar resource accumulations and deployments *and* similar cognitive models (Nath & Gruca, 1997; Thomas & Carroll, 1994). Strategic groups are the outcomes of dynamic interaction between resources and cognitive models over time (Bogner, 1996; Bogner & Thomas, 1996).

While it is not unreasonable to describe the strategic group as an "analytic convenience" (Hatten & Hatten, 1987), it is arguably a theoretical construct. The strategic group concept within strategic management is derived from a variety of approaches emphasizing similarities (and differences) in product market strategy, resource endowments, capabilities, managerial beliefs, strategic interactions, and interdependence (Daems & Thomas, 1994; Daems & Vandinpenen, 1994). Theoretical foundations for the concept of strategic groups, therefore, have a variety of sources:

1. Srategic choice and endogenous mobility barriers such as economies of scale, experience-related cost asymmetries, contractual commitments, product differentiation and irreversible (sunk cost) investments (Gilbert, 1989; Porter, 1991; Tang & Thomas, 1992);
2. Different internal organizational structures, organizational control systems, and organizational culture determining different strategic behavior and capabilities to execute strategies (Chandler, 1962; Gales & Kamath, 1993; Lewis & Thomas, 1994; Markides & Williamson, 1996);
3. Path dependencies (historical developments) of firms with different resource endowments and vintages of technologies (and hence different cost functions) responding to exogenous technological factors or changes in demand (Bogner, Thomas, & McGee, 1996; Kogut, 1984; Tang 1988);
4. Lumpy market conditions (i.e., discrete niches), high transaction costs and sticky resources that influence later strategic behavior (Anderson & Lawless, 1993; Chang & Choi, 1988);
5. Differential risk preferences and firm objectives (Baird, Sudharshan, & Thomas, 1988; Porter, 1979);
6. Game-theoretic formulations (Kumar, 1987; Kumar, Thomas, & Fiegenbaum, 1990);

7. Cognitive taxonomies (Porac & Thomas, 1990; Porac, Thomas & Baden-Fuller, 1989; Porac et al., 1995); and
8. Spatial competition (Hotelling, 1929) in which strategic groups exist when sunk costs are relatively modest in a product differentiable market (Johnson, 1995a; Tang & Thomas, 1992).

We note that while the key variable for determining strategic groups in spatial competition models is "relocation costs" (i.e., switching costs), the key variable in the resource-based theory is "sticky resources" (Ghemawat, 1991) (i.e., switching costs);

We turn next to establishing the evolution and function of the resource-based concept of the firm as a collection of resources.

THE EVOLUTION AND FUNCTION OF THE RESOURCE-BASED CONCEPT OF THE FIRM AS A COLLECTION OF RESOURCES

For the purposes of this paper we describe a broad definition of the resource-based theory of the firm begun by Penrose (1959). Following recent texts (e.g., Barney, 1997; Collis & Montgomery, 1997; Grant, 1995) we consider resource-based theory broadly defined to include: (i) resource-based view (Montgomery & Wernerfelt, 1988; Wernerfelt, 1984); (ii) commitment (Ghemawat, 1991); (iii) dynamic capabilities (Teece & Pisano, 1994; Teece, Pisano, & Shuen, 1997) and (iv) a knowledge-based approach (Conner & Prahalad, 1996; Foss, 1996a, 1996b; Fransman, 1994; Grant, 1996b).

In addition to the theoretical and empirical papers highlighted in the text, the resource-based theory is also informed by in-depth case studies and mathematical modeling. Clearly, the case study method has been an important component of the development of resource-based theory (see e.g., Argyres, 1996a; Chandler, 1962, 1990; Collis, 1991; Ghemawat, 1993; Hall, 1993; Leonard-Barton, 1992, Ollinger, 1994; Penrose, 1960; Richardson, 1964). For example, Penrose (1960) found that indivisibilities and learning are important sources of firm expansion. Extensive knowledge of cellulose chemistry possessed by the Hercules Powder Company provided a continuous inducement to the firm to search for new ways of using its capabilities (such as in artificial fiber and the plastics industry).

Moreover, mathematical modeling has helped to further refine resource-based theory (see e.g., Baumol, 1962; Ingham, 1992; Lippman & Rumelt, 1982; Lippman, McCardle, & Rumelt, 1991; Marris, 1963; Oi, 1983; Rubin, 1973; Slater, 1980a; Uzawa, 1969; Williamson, 1966). For example, Lippman and Rumelt (1982) find that irreducible uncertain imitability due to causal ambiguity *generates* the heterogeneity of firms and also acts as an isolating mechanism for *sustaining* heterogeneity where the final free-entry equilibrium is achieved through processes of variation and selection. Equilibrium is permeated by heterogeneous

firms with evolved local advantages. It is the juxtaposition of *isolating mechanisms* with *uncertainty* that permits the modeling of heterogeneity in an equilibrium framework. Isolating mechanisms refer to phenomena that limit the ex post equilibration of rents among individual firms.

The resource-based theory of the firm is a dynamic representation of a firm's efforts to position itself in industrial and global competition (Peng & Heath, 1996). Thus, prediction on the *rate* of firm expansion has been developed theoretically (Penrose, 1959; Prescott & Visscher, 1980; Slater, 1980a;) and tested empirically (Gander, 1991; Shen, 1970; Thompson, 1994), and the *direction* of firm growth has been extensively investigated (e.g., Lemelin, 1982; MacDonald, 1985; Montgomery & Hariharan, 1991; Stewart, Harris, & Carleton, 1984). Further, the performance consequences of resource-based firm effects have been investigated (Anand & Singh, 1997). Although industry effects are important (Amato & Wilder, 1990; Schmalensee, 1985; Scott & Pascoe, 1986), the resource-based view places primary emphasis on investigating firm-level effects on performance (Amel & Froeb, 1991; Brush & Bromiley, 1997; Rumelt, 1991; McGahan & Porter, 1997).

In the resource-based theory, resources are the basic unit of analysis and may be classified under a few headings—for example, financial, human, intangible, organizational, physical, and technological (Farjoun, 1994; Grant, 1991; Hall, 1992, 1993; Hofer & Schendel, 1978)--but the essential concept is that the sub-division of resources may proceed as far as is useful for the problem at hand (Penrose, 1959, 1985). The resource-based theory not only captures the content of a "continuing search for rent" (Bowman, 1974, p. 47), but also the process through which managers pursue that rent over time through resource allocation decisions (Harrison, Hall, & Nargundkar, 1993; Robins & Wiersema, 1995), and learning (Nonaka, 1994; Schoemaker, 1990; Tsoukas, 1996). The evolution and function of the resource-based concept runs parallel with the dynamic strategic group concept in terms of its synthesis of economic, behavioral, and cognitive approaches.

The Economic and Behavioral Foundations of the Resource-based Theory

Stated in terms of outcomes, in the resource-based theory the persistence of firm profits is the result of a combination of unique historical conditions and culture (Barney, 1986a; Camerer & Vepsalainen, 1988; Kogut & Zander, 1996), unique locations, firm-specific resources (i.e., sunk cost commitments) (Bergh, 1995; Caves, 1984; Ghemawat, 1993), uncertain imitability due to causal ambiguity and social complexity (Demsetz, 1973; Lippman & Rumelt, 1982, Powell, 1992, 1995), time compression diseconomies (Dierickx & Cool, 1989), difficulties in selling information coupled with opportunism (Teece, 1982), and legal restrictions (e.g., regulation (Maijoor & Van Witteloostuijn, 1996) and intellectual property rights (Miller & Shamsie, 1996) of patents, trademarks, copyrights)—all of which

prevent competitors from effectively matching an established firm's idiosyncratic bundle of rent-generating resources. Core competencies and superior organizational routines in one or more of the firm's value-chain functions may enable the firm to generate rents from a resource advantage (Hamel & Heene, 1994; Hamel & Prahalad, 1994; Heene & Sanchez, 1997; Hitt & Ireland, 1985; Prahalad & Hamel, 1990). Core competencies are a function of cognitive traits including tacit understandings (Polanyi, 1962; Winter, 1987, 1995), firm-specific skills (Helfat, 1994, 1997; Henderson, 1994; Henderson & Cockburn, 1994), product-specific competencies (Arora & Gambardella, 1997), and resources that are directed towards the attainment of the highest possible levels of customer satisfaction relative to competitors (Bogner & Thomas, 1994).

The resource base focuses on rents other than monopoly rents derived from collusion and government co-optation (Bailey & Williams, 1988; Conner, 1991). These different types of rents suggest that different strategic behaviors for firms are tied to different resource advantages. Ricardian rents (Ricardo, 1817) are based on the possession of scarce and valuable resources (Barney, 1986b, 1988, 1991; Peteraf, 1993b). Composite quasi-rents (Klein, Crawford, & Alchian, 1978) may be appropriated in bilateral monopoly situations that can commonly arise when co-specialized resources are involved (Coff, 1997; Liebeskind, 1996; Teece, 1990). Finally, Schumpeterian rents may be derived from successful entrepreneurship (Montgomery, 1995; Rumelt, 1987) where firms develop resources that are unique for a significant period of time (McGrath, MacMillan, & Venkatraman, 1995; McGrath et al., 1996). In a Schumpeterian view, if a resource does not yield rents in the long-run, but the process of adjustment to the zero-rent state is slow, substantial quasi-rents may still be earned in the interim (Mahoney & Pandian, 1992; Mosakowski, 1993).

We may define equilibrium as a constellation of selected interrelated variables (of particular magnitudes) so adjusted to one another that no inherent tendency to change prevails in the model that they constitute. The models as well as the equilibria are, of course, mental constructions (based on abstraction and invention). To argue that resource-based *models* should be equilibrium arguments is a defendable proposition (Barney, 1991). But note that it is only after the variables are selected and their interrelations assumed that we can speak of equilibrium and disequilibrium in the sense in which they are used in economic analysis. However, strategic management also attempts to characterize concrete situations in the world of experience and to insist upon characterizing a concrete situation "observed" in reality as one of "equilibrium" is to commit the fallacy of misplaced concreteness (Machlup, 1967). The use of the analytical equilibrium concept as a designation of a concrete historical situation is regarded as misplaced concreteness, first because of the general fallacy involved in jumping the distance between useful fiction and the particular data of observation and, second, because of the fallacy involved in forgetting the relativity of equilibrium with respect to variables and relations selected. The phrase "relativity of equilibrium" gives expression to the facts that

any number and combinations of variables may be chosen for a model, depending on the analytical habits, skills, and purposes of the modeler; that the same values of variables may account for both equilibrium or disequilibrium depending on the other variables with which they are made to keep company and the relations assumed to prevail between them; and that different problems may call for very different models for use in analysis (Machlup, 1967).

The upshot is that the resource-based theory (broadly defined) can be informed both by *disequilibrium* arguments (e.g., Teece, Pisano, & Shuen, 1997) and by *equilibrium* arguments (e.g., Lippman & Rumelt, 1982). Strategy is concerned with both limits to the ex post equilibration of rents *and* with the quasi-rents derived from quasi-fixed inputs (such a firm-specific managerial talent) that are sustained for a significant period of *calendar time* although they do not pass the test of a timeless barrier limiting the ex-post equilibration of rents among individual firms. As Mosakowski (1993) notes the benefits of considering sustainable rents in calendar time is that it provides a role for the entrepreneur as one who provides the resolution to disequilibrium situations and serves a similar function to the role of the arbitrageur.

Since the generation and maintenance of rents is arguably a major theme of strategic management research (Rumelt, Schendel, & Teece, 1991, 1994), it is hardly surprising that the strategy field is attracted to dynamic theories such as Schumpeter's (1934), as well as resource-based/capabilities theory. In fact, the two approaches naturally blend into each other (Amit & Schoemaker, 1993; Mahoney, 1995; Montgomery, 1995; Williamson, 1991).

Conner and Prahalad (1996) note that a theory of performance differences between firms necessarily implies and incorporates a theory of the firm itself. Put differently, the market frictions necessary for rents are market frictions that are sufficient for the existence of the firm. Market frictions are the focus of agency, property rights, and transaction cost theory. Indeed, we argue that competent development of the resource-based theory of the firm requires knowledge of organizational theory and organizational economics, including: (i) Penrose's disequilibrium approach (Teece, 1982); (ii) an equilibrium economic approach (Lippman & Rumelt, 1982; Slater, 1980b); (iii) property rights (Hart, 1995; Rumelt, 1984); (iv) game theory and sunk costs (Ghemawat, 1991); (v) behavioral theory of the firm (Amit & Schoemaker, 1993); (vi) networks (Black & Boal, 1994; Eisenhardt & Schoonhoven, 1996); (vii) transaction cost theory (Chi, 1994); (viii) agency theory (Collis & Montgomery, 1997); and (ix) Schumpeterian (evolutionary) theory (Teece, Pisano, & Shuen, 1997).

Resource-based development is a dynamic race that is scenario dependent (Chandler, 1992; Loasby, 1991). Changing consumer demands and managerial choices provide both opportunities and threats for future resource development in a path-dependent process (Arthur, 1994). But future choices are determined by both the firm's and its competitors' resource endowments. Indeed, the concepts of isolating mechanisms (Reed & DeFillippi, 1990; Rumelt, 1984), invisible assets

(Itami & Roehl, 1987), firm capabilities (and rigidities) (Argyres, 1996b; Leonard-Barton, 1992, 1995; Madhok, 1996; Nelson, 1991; Rumelt, 1995), strategic flexibility (Sanchez, 1993, 1995; Sanchez, Heene, & Thomas, 1996), knowledge management (Sanchez & Mahoney, 1996; Spender, 1996), managerial and human resource capabilities (Hansen & Wernerfelt, 1989; Kamoche, 1996; Lado, Boyd, & Wright, 1992; Lado & Wilson, 1994), coordination capabilities across functions, across regions, across products, and across time periods (Lado, Boyd, & Hanlon, 1997; Rumelt, 1994), and sets of differentiated skills, complementary assets, and dynamic organization routines (Teece, Pisano, & Shuen, 1997) require a comparative analysis of competitors' resource bases, capabilities—or at least their observable consequences—(Godfrey & Hill, 1995), and environmental opportunities.

Schumpeter's (1934) focus on new, alternative deployments of resources as the source of economic rents recognizes the alternative competitive postures that different firms can seek within the same industry, (see also, Nelson & Winter, 1982; Stuart & Podolny, 1996). When multiple firms pursue strategic options across an industry they produce patterns of resource accumulations. Similarly, resource-based theory suggests that a firm's resources and capabilities influence its posture in the competitive environment. Excess resources and managerial skills direct strategic choices (Chatterjee, 1990; Chatterjee & Wernerfelt, 1991; Montgomery & Hariharan, 1991). Importantly, both Schumpeter (1934) and Penrose (1955) suggest that firms with similar resource bases often act in similar ways. Isolating mechanisms in the resource-based theory conceptualize barriers to imitation at the firm-level. Like mobility barriers, isolating mechanisms can include commitments that constrain the firm from switching to another strategy. Over time their similar resource allocation decisions lock them in rivalry for similar customers.

Cognition in the Resource-based Theory

Resource-based theory involves not only "bundles of resources" (Wernerfelt, 1984, 1995; Wernerfelt & Montgomery, 1988) but also competition between heterogeneous "mental models" that give resource bundles meaning (Mahoney & Pandian, 1992). Fiol (1991) points out that it is through cognition that managers make sense of both their resources and those of their competitors. The mental models of managers, like resource stocks and flows, are dynamic concepts that are influenced by learning (Lant, Milliken, & Batra, 1992; Fiol & Lyles, 1985) and memory (Walsh & Ungson, 1991). Mental models, therefore, play a critical role in directing the path of the resource accumulation process (Barr, Stimpert, & Huff, 1992). Managerial skills (and mental models) in combination with other firm resources can jointly produce rents (Castanias & Helfat, 1991). Mental models and firm-level routines can be distinctive assets when they can be employed to perform tasks, interpret stimuli, or orchestrate behavior better than competitors.

Table 1. Contributions and Comparable Concepts

The Firm-level of Resources	The Group-level of Strategic GroupS
The Nature of Underlying Resources	
Multiple resources constitute the resource-bundle from which a firm's strategy is defined. (Grant, 1991; Wernerfelt, 1984)	Multiple resource dimensions are used in constructing strategic space and positioning the firm. (Cool & Dierickx, 1993)
Resource bundles vary from firm to firm within an industry. (Amit & Schoemaker, 1993)	Groups of firms cluster around similar, but not identical resource bases. (McGee & Thomas, 1986)
Strategies of firms vary because their resource-bases vary; firms grow and change based on resources and decision histories. (Collis & Montgomery, 1997)	Strategic group memberships vary because firms construct different isolating mechanismsto take advantage of different strategic options. (Lippman & Rumelt 1982; McGee & Thomas, 1986)
Sources of Competitive Advantage	
Resources provide the basis for sustainable competitive advantage when competitor can neither acquire nor develop the same resources. (Barney, 1997)	Mobility barriers are isomorphic to isolating mechanisms and make competitive positions "stable and defensible" and are "tied to unique firm characteristics such as possession of idiosyncratic capital." (McGee & Thomas, 1986, P. 153)
Rents are earned not necessarily because of better resources, but because of better use of resources. (Penrose, 1959)	Economic profits of group members vary significantly within groups as well as between groups—how the competitive position is managed is as important as group membership. (Cool & Schendel, 1987)
Managers use their resources to create or take advantage of opportunities. (Wernerfelt, 1984)	Historical development and changes in the structure of an industry "bestows differential advantages/disadvantages on firms" based on their underlying resources. (Porter, 1979, p. 217)
Firm-to-firm performance differences result from different resource-bases and different effectiveness of managerial responses. (Rumelt,1984, 1987)	Performance variations may be found with-in groups due to managerial effectiveness. (Bogner, Pandian, & Thomas, 1994)
Insights Gained by Analysis	
Future actions constrained by firm-specific resources are captured in resource-based analysis. (Rumelt, 1984; Wernerfelt, 1984)	Future actions are constrained by mobility barriers and isolating mechanisms that are constructed from firms' resources. (Lippman& Rumelt, 1982; McGee & Thomas, 1986)
Strategies of firms reflect underlying skills and resources. (Barney, 1997; Wernerfelt, 1984)	Strategies of group members help identify underlying skills and resources. (Mascarenhas & Aaker, 1989)

Parallel with strategic group theory, we argue that two sources of firm heterogeneity in resource-based theory--resources and mental models—are, in fact, interrelated. For example, rich connections among the firm's resources, distinctive competencies (Andrews, 1971; Selznick, 1957), and managers' mental models drive the diversification process (Bettis & Prahalad, 1995; Ginsberg, 1990; Grant, 1988; Prahalad & Bettis, 1986). Unused productive services of resources "shape the scope and direction of the search for knowledge" (Penrose, 1959, p. 77). Current resources and capability profiles (Ansoff, 1965, p. 76) serve as "cognitive drivers" for future strategy (Itami & Numagami, 1992) and these cognitive advantages can lead to economic rent (Ginsberg, 1994). Thus, the iterative sequence of perception and behavior across the industry result in mental models of competition that can influence performance.

A MULTI-DISCIPLINARY SYNTHETIC PERSPECTIVE

The resource-based and strategic group research streams may have emerged from two separate schools of economics, but they have reached similar conclusions about the dynamics of business-level competition. In Table 1 several of the parallels that have developed in the literature are presented.

While Table 1 shows parallel perspectives, it is still another step to achieve synthesis. That is, for the parallel concepts in Table 1 to achieve synthesis there needs to be a conceptualization that uses both the strategic group and the resource-based views simultaneously.

Building on the foundations just described, it appears that generally research from both the strategic group and the resource-based literatures now resides at the interface among economic, behavioral, and cognitive approaches (Mahoney, 1992, 1995; Porac & Thomas, 1990; Zajac, 1992). An emerging synthesis of resource-based and strategic group research is reflected in recent work (Mehra, 1994). For example, research in the strategic group literature suggests that resource accumulation on the firm level, patterns of these accumulations across groups of rivals, and cognitive models used by managers must be combined to provide the necessary insight for understanding complex phenomena (Bogner & Thomas, 1993). Similarly, in the resource-based literature the heterogeneity of the firm is studied as a "bundle of resources" (Wernerfelt, 1984) and as a "bundle of mental models" (Barr, Stimpert, & Huff, 1992) that may inform strategic group theory.

We suggest that an emerging synthesis of cognitive, behavioral, and economic approaches is a result, in large part, of an emphasis on managerial learning as a key to sustaining competitive advantage. A resource learning view of competition is emerging as a new paradigm. In this view, the firm cannot be separated from the competitive dynamics in which it is engaged (Baum & Korn, 1996; Ingram & Baum, 1997); the resource base of the firm only has meaning in a competitive con-

next. For example, why are American firms international leaders in industries such as aircraft and aerospace, chemical, computers, food processing, oil refining, and pharmaceuticals, whereas American firms in automobiles, consumer electronics, machine tools, and semiconductors have fallen behind? We argue here that one answer to this question involves further inquiry on the evolution of resource accumulation, the evolution of organizational capabilities via organizational learning, and competitive dynamics. While strategic group theory on *mobility barriers* and resource-based theory on *isolating mechanisms* can provide the resource-based criteria for a sustainable competitive advantage, organizational learning theory can show us how learning processes to utilize resources can be carried out.

Competitive rivalry dictates resource accumulations, resource accumulations dictate rivalry, and both concepts are linked dynamically by the cognitive processes and learning that takes place over time. In fact, experience-based learning may be considered the key variable for explaining firm heterogeneity—which is arguably the most fundamental assumption of strategic management that diverges from I.O. and microeconomic models. Penrose (1959, 1995) advocates a "resource learning theory of the firm" and provides a fundamental challenge to the economist's view of the firm:

> Experience...develops an increasing knowledge of the possibilities for action and the ways in which action can be taken by...the firm. This increase in knowledge not only causes the productive opportunity of a firm to change...but also contributes to the 'uniqueness' of the opportunity of each individual firm. (1959, pp. 52-53).

Penrose (1959) emphasizes the subjective, productive opportunity of the firm based on human capital specificity, teamwork, and associational benefits.

The tie between the different strategic alternatives (i.e., "possibilities") and firm action is learning (Best, 1990; Huber, 1991). Simply identifying patterns of firm resources is not sufficient. Although firms may have similar resources, the services they can generate depend on the history of their use and the experience of the past and present operations of the firm. In addition, the services of resources depend on entrepreneurial vision and creativity. Thus, the performance outcomes they generate vary from firm to firm. Competitive advantage among firms with similar resources often flows through the complex specificity of workplace knowledge gained through experience (Spender, 1992, 1993; Spender & Grant, 1996). Through long experience and commitment, formulation and implementation are crafted into a fluid process of learning and combinative capabilities (Kogut & Zander, 1992; Senge, 1990) via interfirm knowledge transfer (Mowery, Oxley, & Silverman, 1996; Zander & Kogut, 1995) and intrafirm knowledge transfer (Szulanski, 1996). Indeed, recent resource-based theory has emphasized the importance of knowledge integration, asset complementarity and strategic coherence (Grant, 1996a; Helfat, 1997; Henderson & Clark, 1990; Henderson & Cockburn, 1994; Henderson & Mitchell, 1997; Iansiti & Clark, 1994; Milgrom & Roberts, 1990; Pisano, 1994; Teece, Rumelt, Dosi, & Winter, 1994).

New learning, such as innovations, are the stocks and flows of a firm's combinative capabilities (Kogut & Zander, 1992) that generate new ideas and artifacts from existing knowledge. These combinative capabilities are often platforms into new markets. Combinative capabilities serve as a driver of strategy.

Since learning processes involve both firms and their competitors, these processes can have both homogenizing and differentiating outcomes. On the one hand, similarities among resource endowments can drive managers to pursue similar environmental opportunities resulting in similar learning experiences. Observation of rivals' actions and their outcomes, lead to shared vicarious experience and learning. This learning results in the meaningful similarities among firms that groups capture.

On the other hand, differential resource endowments (including differential information and knowledge bases), and differential experience and commitment, in combination, can result in different rates of learning of absorptive capacity (Cohen & Levinthal, 1990). Different rates of learning, in a circular flow, result in further asymmetries in resources (particularly in distinctive competencies), information, and experience which result in firm heterogeneity and differential firm capabilities (Dooley, Fowler, & Miller, 1996; Mahoney & Sanchez, 1996; Sakakibara, 1997). For example, cognitive decision-making biases and organizational implementation problems can lead to impediments to imitation of a successful firm's resources and capabilities.

Thus, learning builds both meaningful similarities and differences among firms. Learning processes and the competitive advantages that they produce cannot be integrated into strategic management without capturing the underlying concepts of both the strategic group and resource-based views simultaneously.

Prescriptively, developing superior heuristics and improving group decision-making and organizational learning processes for the purpose of accumulating and deploying (networks of) resources may arguably be the heart of strategic management as it increasingly focuses on competitive dynamics (Black & Boal, 1994; Eisenhardt & Schoonhoven, 1996; Hamel, 1991). *Descriptively*, managing strategically involves a discovery procedure in which heterogenous mental models of managers using heterogenous resources are involved in an ongoing competition. This synthetic perspective of strategy clearly requires the perspectives of both the strategic group and resource-based literatures. It is, therefore, not surprising that with the increased role of processes such as managerial learning is moving the literature toward the beginnings of a synthesis of cognitive, behavioral, and economic approaches.

The emerging synthetic view of the firm is defined by its competitive adaptation where resources, cognitive processes, and resource-learning processes (at the individual, firm and interfirm levels) are some key primitives for modeling dynamic competition. This synthetic paradigm shift that is in progress is moving us toward an increasing emphasis on competitive dynamics. This paradigm shift is required in order to understand changing firm and strategic group interdependencies over

Thus: Neither internal models of the firm, nor "black box" models capturing firm rivalry are sufficient. Increasing focus on dynamic competition requires simultaneous attention to both strategic group and firm rivalry over time, and firm-level resources, cognitive processes, and resource-learning processes.

Using deductive economics, in isolation leads to the following propositions:

1. Rents are derived from heterogeneous resources;
2. Rents are achieved by accumulating better resources via information asymmetry or luck;
3. Resources that provide isolating mechanisms and mobility barriers should determine a firm's strategy; and
4. "Managing" involves the accumulation and deployment of resources.

Converting to a "resource-learning theory" that combines economic, behavioral, and cognitive research leads to the following revisions to the propositions stated above:

1. Resources are derived from heterogeneous resources *and* heterogeneous mental models that are intertwined;
2. Managerial skills *in combination* with other firm resources *jointly* produce rents;
3. Resources *and* capabilities should serve as drivers of strategy;
4. Managers with heterogenous mental models and heterogenous capabilities (which are protected by mobility barriers and isolating mechanisms) are involved in an ongoing competition.

FUTURE RESEARCH

Schoemaker (1993) argues that the present decade in the field of strategy is poised to integrate organization and cognitive sciences with economic science. In particular, we argue that the development of the resource-based and strategic group concepts via economic, behavioral, and cognitive research reflects the synthetic characteristic of strategic management as pragmatic inquiry. We conclude by suggesting how such a pragmatic strategy theory can guide research both substantively and procedurally.

The emerging synthesis of resource-based and strategic group theories that is described here points out several research opportunities. First, Mintzberg (1990) emphasizes the positional (Hatten, Schendel, & Cooper, 1978; Porter, 1980), learning (Quinn, 1980; Weick, 1979), and cognitive (Simon, 1991) schools and each of these schools have been discussed here. From our discussion of the resource-based and strategic group literatures, one can argue that these three schools nurture each other. While the positional school informs the strategic group

and resource-based analysis relative to tangible and intangible resources, the learning and cognitive schools highlight the subjective nature of these resources: the possibilities of using productive resources change with changes in knowledge. Thus, based on this paper's reasoning, a synthesis of the positional, learning, and cognitive schools can be fruitful. Indeed, we argue that analysis of competitive dynamics in a Schumpeterian marketplace, must include cognitive theories, behavioral theories, and economic theories on resources and strategic groups.

Second, richer theories of competitive dynamics and better econometrics are in progress in the emerging strategy paradigm that will enable greater understanding of the conditions under which firms will tend to cluster into distinct groups within an industry. Third, better model specifications and econometrics for modeling competitive dynamics will also allow for better (unbiased) estimations of the effects of resource similarities on degree of rivalry. Fourth, innovative studies that make headway on unobservables are required to advance resource-based theory and strategic groups.

Invisible assets, as the name might suggest, are unobservables. Godfrey and Hill (1995) note that the unobservability of utility does not doom agency theory; the unobservability of some transaction costs does not doom transaction cost theory; and the resource-based theory does not become invalid because key (invisible) resources are not observable. To reject a theory one must be able to show that the predictions of observable phenomena that are derived from that theory do not hold up under empirical testing. In agency theory, abnormal returns are the observable consequences of agency costs. In transaction cost theory, governance structure choice is an observable consequence of (measurable) asset specificity. In resource-based theory, technological inflows are the observable consequences of unobservable resources such as know-how (Robins & Wiersema, 1995).

Finally, we recommend that strategic group and resource-based theory should move beyond static notions of competition where:

- Theoretical construction abstracts from historical time;
- Theory focuses on the stationary state;
- Taxonomic and tautological arguments are made;
- Conditions of equilibrium are established; and
- Time is omitted as an independent variable.

Strategic group analysis and resource-based theory require a study of dynamic processes where:

- There is an historical description of observed sequences over time;
- Theory focuses on growth and fluctuation;
- Arguments are empirically based;
- Paths toward equilibrium are investigated; and
- Some or all quantities are functions of time. (See Machlup, 1967)

In summary, the product of future strategy research must advance our understanding of strategic group dynamics and a resource theory of the firm that captures organizational dynamics.

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NOTES

1. There have been a number of industries studied in the strategic groups literature including airlines (Carini & Walker, 1992; Peteraf, 1993c; Ryans & Wittink, 1985; Smith, Grimm, Wally, & Young, 1997), banking (Amel & Rhoades, 1988, 1992; Bresser, Dunbar, & Jithendranathan, 1994; Hayes, Spence, & Marks, 1983; Mehra, 1996; Passmore, 1985), brewing (Carroll & Swaminathan, 1992, 1994; Day, Lewin, & Li, 1995; Hatten & Hatten, 1985; Hatten, Schendel, & Cooper, 1978; Houthoofd & Heene, 1997; Johnson & Thomas, 1987; Schendel & Patton, 1978; Tremblay, 1985, 1993), chemical process industries (Newman, 1979); consumer goods (Oster, 1982; Porter, 1979), electronics (Ulrich & McKelvey, 1990), grocery (Lewis & Thomas, 1990), hospitals (Ketchen, Thomas, & Snow, 1993; Nath & Sudharshan, 1994), information systems (Galbraith, Merrill, & Morgan, 1994), insurance (Fiegenbaum, 1987; Fiegenbaum & Thomas, 1990, 1993; Gales & Kamath, 1993; Tang, Thomas, & Fiegenbaum, 1994), microcomputers (Bauerschmidt & Chrisman, 1993; Steffens, 1994), oil drilling (Mascarenhas, 1989; Mascarenhas & Aaker, 1989), pharmaceuticals (Bierly & Chakrabarti, 1996; Bogner, 1991; Bogner, Pandian, & Thomas, 1994; Bogner, Thomas, & McGee, 1996; Cool, 1985; Cool, Dierickx, & Martens, 1994; Kerin, Mahajan, & Varadarajan, 1990; Sudharshan, Thomas & Fiegenbau, 1991), perfumes, cosmetics, and toiletries (Olusoga, Mokwa, & Noble, 1995), petroleum (Primeaux, 1985), retailing (Harrigan, 1985), as well as cross-industry studies (Caves & Pugel, 1980; DeBondt, Slevwaegen, & Veugelers, 1988; Greening, 1980; Hergert, 1987; Jegers, 1994; Kumar, 1990; Lawless, Bergh, & Wilsted, 1989; Lawless & Tegardin, 1991; Martin, 1988; Mills & Schumann, 1985; Newman, 1978; Wiggins & Ruefli, 1995).

2. Discussions on strategic group methodology may be found in Aldenderfer and Blashfield (1984), Dubes and Jain (1979), Everitt (1980), Friedman and Rafsky (1979), Funkhouser (1983), Hartigan (1975), Jain and Dubes (1988), Johnson (1993, 1995b), Ketchen and Shook (1996), Milligan (1980), Milligan and Cooper (1985), Pitt and Thomas (1994), Punj and Stewart (1983), and Romesburg (1984), among others.

3. There are some tensions between social constructionist and social realist positions on strategic groups (Porac & Rosa, 1996) that correspond, although not perfectly, to cognitive and economic approaches. These tensions, which one can find in the strategic group literature, recur throughout social science. Gardner (1985, p. 8), for example, traces "the perennial dispute between those of a rationalist persuasion (who view the mind as actively organizing experiences on the basis of pre-existing schemes); and those of an empiricist bent (who treat mental processes as a reflection of information obtained from the environment)." Following Gardner (1985), we suggest multi-disciplinary cooperation because legislating a single seamless discipline of scientific inquiry seems ill-considered.

4. Managerial perceptions have been used to classify firms according to proposed taxonomies such as Miles and Snow's (1978) topology of defenders, prospectors, analyzers and reactors (see

Hawes and Crittenden [1984], for an application to retailing; Zajac and Shortell [1989] for an application in a dynamic hospital environment). Gronhaug and Falkenberg (1989) find great discrepancies in self-evaluation and competitors' evaluation of Miles and Snow's (1978) four strategies. Arguably it is the *perceived* strategic groups that are instrumental in determining firm conduct in the short run (Gripsrud & Gronhaug, 1985). Other taxonomies that have been deployed are Frazier and Howell's (1983) use of Abell's (1980) three dimensions of customer groups, customer functions and technologies to develop strategic maps, while Dess and Davis (1984) use Porter's (1980) generic strategies to analyze strategic groups. Kim and Lim (1988) find that top management perceptions of strategic groups in the electronic industry in Korea are based on the generic strategies of Porter (1980). Arguably, these cognitive taxonomies shared by industry members are enacted through environmental interactions (Bogner & Thomas, 1993; Newman, 1979).

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