Human Relations, Vol. 50, No. 6, 1997

The Cognitive Analysis of Competitive Structures: A Review and Critique

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In recent years, there has been a growth of interest in the study of business competition from a cognitive perspective. This paper reviews this rapidly expanding literature in order to synthesize key empirical findings and identify significant theoretical and methodological issues which warrant further investigation. It is argued that the notion of "competitive enactment" and the associated "cognitive life cycle" approach recently advanced by Porac and his associates (Porac, Thomas, & Baden-Fuller, 1989; Porac & Thomas, 1990; Levenhagen, Porac, & Thomas, 1993) represent a potentially major breakthrough in our understanding of the dynamics of competition in industries and markets. However, several important propositions are derived for which the currently available empirical evidence is found wanting. Furthermore, a number of methodological hurdles are identified which have yet to be overcome if the validity of these propositions is to be investigated with an acceptable degree of rigor.

KEY WORDS: managerial and organizational cognition; cognitive mapping; competitive analysis.

INTRODUCTION

In recent years, there has been a growing interest in the study of business competition from a cognitive perspective (e.g., Gripsrud & Gronhaug, 1985; Walton, 1986; Fombrun & Zajac, 1987; Porac & Thomas, 1990; Reger & Huff, 1993). A number of studies have now accumulated which suggest that a range of concepts and techniques borrowed from the cognitive sciences offer considerable promise as a means of gaining rich insights into issues and processes which lie at the heart of the field of strategic management. The purpose of this paper is to review this rapidly expanding

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0018-7267/97/0600-0625$12.50/1

literature in order to integrate empirical findings and identify significant theoretical and methodological issues which warrant further investigation.

Much of the literature on competitive strategy is predicated on the assumption that business environments are objective entities waiting to be discovered through formal analysis. In recent years, however, there has been a growing recognition that, ultimately, it is actors' perceptions of competitive positioning, filtered through existing mental models which form the basis for strategy formulation and, therefore, these mental models are worthy of study (e.g., Porac, Thomas, & Emme, 1987; Stubbart, 1989; Porac & Thomas, 1990; Reger, 1990; Calori, Johnson, & Sarnin, 1992).

While the cognitive approach to understanding competitive strategy has gained increasing ground in recent years, to date, empirical research has been confined largely to small-scale, exploratory studies (e.g., Gripsrud & Gronhaug, 1985; Reger, 1990; de Chernatony, Daniels, & Johnson, 1993; Hodgkinson & Johnson, 1994). These studies have established the viability of the cognitive approach for gaining potentially useful insights into processes of strategy formulation and have led to some interesting theoretical developments. However, larger-scale empirical work, designed to test the key substantive claims of this emerging theory, has been almost nonexistent. Nevertheless, a sufficient volume of evidence has now accumulated to take stock of the situation.

The paper is organized in four sections: we shall begin with a relatively brief analysis of the background research which has led to the recent interest in the cognitive analysis of competitive positioning in industries and markets. This is necessary in order to provide a context within which to evaluate the significance of various theoretical, empirical, and methodological developments arising from the literature associated with the study of competitive positioning strategy from a cognitive perspective.

Next we shall consider these developments, in detail, focusing in particular on the notion of "competitive enactment" and the associated "cognitive life cycle" conception developed by Porac and his associates (Porac, Thomas, & Baden-Fuller, 1989; Porac & Thomas, 1990; Levenhagen, Porac, & Thomas, 1993). As we shall see, this approach, which seeks to integrate and build on previous research drawn from a number of diverse perspectives in the strategy field, represents a potentially major breakthrough in terms of its contribution to our understanding of the dynamics of competition in industries and markets.

The third section considers the extent to which the currently available evidence supports this conception of the evolution of competitive structures in industries and markets. Three fundamental propositions are derived for which the extant evidence is found wanting. Finally, the concluding section

draws together the key issues and themes arising from this review and sets out a research agenda.

BACKGROUND TO THE DEVELOPMENT OF COGNITIVE APPROACHES FOR THE ANALYSIS OF COMPETITIVE STRUCTURES

Much of the strategy literature on business competition has been dominated by attempts to refine techniques for the analysis of competitive structures in industries, based on the notion of strategic groups (e.g., Hatten, Schendel, & Cooper, 1978; Newman, 1978; Harrigan, 1980; Oster, 1982; Hawes & Crittenden, 1984; Harrigan, 1985; Cool & Schendel, 1987; Hatten & Hatten, 1987; Johnson & Thomas, 1987; Cool & Schendel, 1988; Fiegenbaum & Thomas, 1990; Lewis & Thomas, 1990). The concept of strategic groups was developed by Hunt (1972) in a study which examined the differential performance of firms in the American home appliance industry (so-called "white goods") in the 1960s, and the commonly accepted definition of the concept is that provided by Porter:

> A strategic group is the group of firms in an industry following the same or a similar strategy along the strategic dimensions. An industry could have only one strategic group if all the firms followed essentially the same strategy. At the other extreme, each firm could be a different strategic group. Usually, however, there are a small number of strategic groups which capture the essential strategic differences among firms in the industry. (Porter, 1980, p 129)

The ultimate goal of the theory of strategic groups is to account for intra-industry variations in the competitive behavior and performance of firms. According to the theory of strategic groups, firms within a given strategic group resemble one another closely in terms of their strategic capabilities. Consequently, they are able to anticipate one anothers' likely reactions to environmental jolts and are likely to recognize their mutual dependence on one another, and respond accordingly. Between strategic groups, however, a rather different scenario is predicted (Porter, 1979).

The theory predicts that intergroup differences in strategy and profitability arise for two main reasons, namely, differential entry barriers and, more generally, the presence of mobility barriers (Caves & Porter, 1977). Entry barriers constitute the various (largely economic) factors which prevent would-be players from entering a particular industry or market. Their effect is not uniform, however, with some strategic groups being afforded better protection than others.

The concept of mobility barriers is a generalization of the concept of entry barriers, which seeks to explain the strategic behavior of firms already operating within an industry. Mobility barriers are the various factors which

prevent members of particular strategic groups from transferring or extending their membership into other groups:

> The argument is that the difficulty of entry into an industry depends on the strategic position the firm seeks to adopt (or on its strategic group). Mobility barriers are deterrents to a shift in strategic position of firms within an industry, deterrents that give some firms stable advantages over others. Thus mobility barriers provide an explanation of differences in performance by firms in the same industry, and provide a conceptual basis for positioning a firm within its industry. (Porter, 1981, p. 615)

Typically, strategic groups have been investigated through the use of secondary financial and accounting information collected by the researcher from company records or, alternatively, through the use of extant generic databases such as PIMS (for a review, see McGee & Thomas, 1986). Implicit within this approach to competitive positioning analysis, is the assumption that such data can capture adequately bases of competition. In recent years, however, there has been a growing recognition that this predominantly economic approach is limited fundamentally in terms of its ability to explain how or why competitive structures in industries and markets come to develop, and on what basis particular strategies are chosen. A further limitation is that the variables selected for analysis by the researcher may not necessarily be the variables which actually guide the decision-making of organizations and hence drive competition (e.g., Porac et al., 1989; Barney & Hoskisson, 1990; Birnbaum-More & Weiss, 1990; Porac & Thomas, 1990; Reger, 1990; Pettigrew & Whipp, 1991; Calori et al., 1992; Reger & Huff, 1993; Hodgkinson & Johnson, 1994).

THEORETICAL DEVELOPMENTS IN THE COGNITIVE ANALYSIS OF COMPETITIVE STRUCTURES

Partly in an effort to advance our theoretical understanding of strategy development and competitive positioning, and partly in order to refine techniques for the analysis of competitive structures, a growing number of scholars have begun investigating competitive strategy from a cognitive viewpoint (e.g., Dess & Davis, 1984; Gripsrud & Gronhaug, 1985; Walton, 1986; Fombrun & Zajac, 1987; Porac et al., 1987; Reger, 1990; Calori et al., 1992). As noted earlier, much of this work has been of an exploratory nature, seeking to investigate the relative merits of particular techniques for mapping strategic thought. Recently, however, several theorists have advanced what we might loosely term "social constructionist" explanations for the emergence of competitive structures in industries and markets (e.g., Porac et al., 1989; Whitley, 1992; Bogner & Thomas, 1993; Easton, Burrell, Rothschild, & Shearman, 1993; Levenhagen et al., 1993; Porac, Thomas, Wilson, Patton, & Kanfer, 1995). According to this emerging body of theory, competitive structures both determine and are determined by strate-

gists' perceptions of the business environment. These structures emerge because over time, strategists from rival firms develop highly similar (or "shared") mental models of the competitive arena, due to the fact that they share similar technical and material problems and frequently exchange information in the conduct of their business transactions. This process of social exchange, in turn, leads to the development of a shared understanding—throughout the community of firms within the marketplace—of how to compete.

Competitive Enactment

Drawing on the work of Berger and Luckman (1967) and Weick (1979), Porac and his associates have termed this process of social construction "competitive enactment" (see, for example, Porac et al., 1989; Porac & Thomas, 1990). This notion depicts a continual objective-subjective-objective cycle which underpins the development of competitive structures. Porac and his associates contend that over time, within a given industry, individuals' beliefs about the identity of competitors, suppliers, and customers become highly unified through mutual enactment processes, in which subjective interpretations of externally situated information are objectified via behavior.

This argument is based on Weick's (1979) observation that organizations often create their environments through collective sense-making processes, then act as if their cognitive constructions were true. Viewed from within this perspective, "industries," "strategic groups," and the like, are sociocognitive constructions, created through a shared interpretation of reality among business rivals, which come to define the boundaries of the competitive arena and on what bases the battles for competitive success are to be fought. According to this view, the mental models of competitive strategists from rival firms become highly similar, over time, thereby creating "group-level" beliefs about the marketplace, because of the tendency of organizations to imitate one another, both directly and indirectly:

> Indirect imitation occurs because strategists from different firms face similar technical/material problems with a finite number of solutions. Belief similarity develops as a result of interpreting the same cues and solving the same problems. Direct imitation occurs because of both formal and informal communications among the set of competitors. Such communications permit the mutual exchange of ideas and concepts by externalizing individual mental models in a publicly observable form. The net result of both indirect and direct imitation is that the strategic choices of individual firms take place within the context of many shared beliefs about how and with whom to engage in transactions in the marketplace. (Porac et al., 1989, p. 400)

This argument is illustrated graphically in Fig. 1. Each competitor is involved in an individual enactment process in which the mental model of

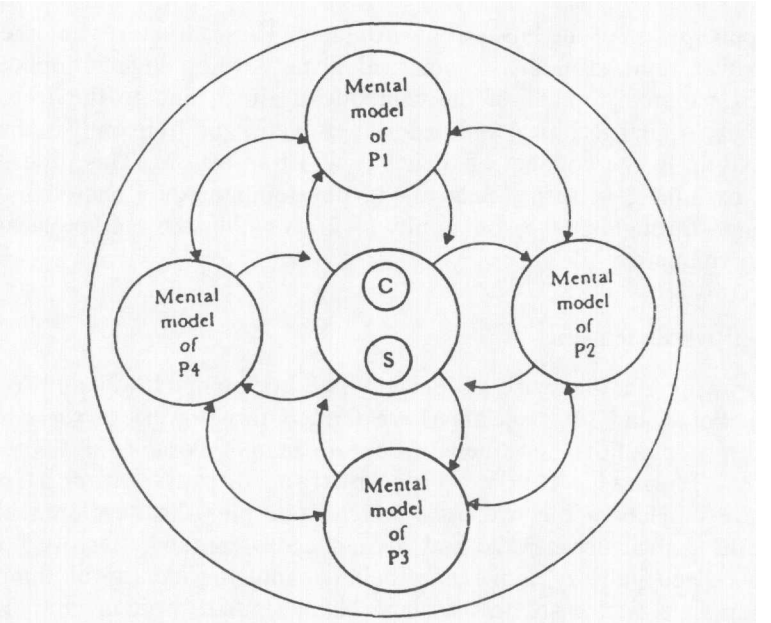

Fig. 1. Mutual enactment processes within an industrial sector. *Source:* Porac, Thomas, & Baden-Fuller (1989), *Journal of Management Studies*, vol. 26, p 401. © Basil Blackwell Ltd, reprinted by permission. (Legend: C = customers; S = suppliers; and Pn = producers)

its strategists is reciprocally intertwined with its strategic choices and the material conditions of the marketplace. Other parties involved in the same transactional network, however, are also enacting their beliefs, through activities within the value chain. While the interpretations of customers, suppliers, and competitors are all involved in structuring the transactional network, it is the enactment processes of the latter which are particularly important, due to the fact that they serve to link firm-level and group-level competitive activities, through the creation of socially shared belief systems.

The basic features of competitive enactment have been demonstrated empirically in a study of the Scottish knitwear industry by Porac and his associates (Porac et al., 1989). In this study, the senior executives from a number of firms were interviewed in order to ascertain the structure and contents of their mental models of the competitive arena. While the combined efforts of Scottish knitwear producers account for a mere 3% of the total amount of knitted outerwear manufactured on a worldwide basis, when asked to define their competitors, the research participants in this study tended to focus exclusively on other Scottish firms. Despite the fact that producers from Italy, the Far East, U.S.A., and other parts of the U.K.

far outstrip the Scots in total output, firms from these other geographical areas were not typically regarded as serious competitors.

Porac and his associates contend that the reason the Scottish firms have come to regard one another as major competitors is due to the existence of a strongly held collective mental model which has directed the managers' attention inward, toward firms highly similar to their own, i.e., other Scottish knitwear producers of high quality, expensive cashmere sweaters in classic designs. Only a limited portion of the potentially available competitive space is considered strategically feasible by the vast majority of players, with firms typically attempting to differentiate themselves primarily on the basis of subtle variations in color and design within the classic motif. Other strategies such as differentiating on the basis of price, the use of innovative fibers and fashion designs are not generally considered viable. In the words of Huff (1982) and Spender (1989), an "industry recipe" has developed, informing rivals on what bases they are to compete with one another.

In short, this group-level mental model has come to define the boundaries of the competitive arena and has led individual firms to consider a relatively narrow range of strategic options. Only firms within the immediate locality of Scotland, who produce a similar range of goods to one another, using similar technological processes of production and common channels of distribution, are regarded as serious competition.

The Cognitive Life Cycle of Market Domains

More recently, Levenhagan et al. (1993) have developed further this theorizing, using the notion of the "cognitive life cycle of market domains"—which, in a number of respects, parallels traditional life cycle notions of the evolution of industries (e.g., Porter, 1980)—in an effort to explain the formation and development of competitive structures.[3] This framework seeks to combine elements of earlier theoretical perspectives such as population ecology (Hannan & Freeman, 1977, 1988) and traditional industrial organization approaches grounded in economics.

According to Levenhagen et al. (1993) market domains develop through a four-stage life cycle (concept formation → concept championing → concept appropriation → the institutionalization of market domains), preceded by a preliminary phase of "precompetitive knowledge development," in which

[3]While the analytical approach adopted by Levenhagen and his associates is that of a life cycle, it should be noted that these authors are at pains to point out that their framework is intended merely as a "pedagogical device," i.e., "No linear, lock-step, sequential set of events is implied. Such an approach would be a contradiction of the basic theoretical stand taken by social constructionists that cognitive and transactional events interact continually with one another" (Levenhagen et al., 1993, p. 76).

multiple knowledge streams are disconnected from one another, separated temporally and spatially, with differential rates of development. During the first stage of development, the "concept formation" stage, creative cognitive agents (entrepreneurs) generate novel ideas which link together previously independent knowledge streams. These ideas, in turn, create new market domains. Thus, for example, Levenhagen and his associates describe how the previously independent technologies of punch cards, binary theory, audion tubes, and symbolic logic were conceptually synthesized in order to create the world's first computer. Subsequently, two further market domains were created when the primary technologies of hardware and software subdivided in order to become independent technologies in their own right.

During the second stage, "concept championing," the new concept(s) must be sold in an effort to develop cognitive infrastructures which, in turn, act as the basis upon which material infrastructures are created. The third stage, "concept appropriation by self and others," refers to the way in which concepts are materially enacted in the marketplace. "Cognitive first-movers" must protect their newly staked territories through the creation of isolating mechanisms and mobility barriers. Later entrants will typically seek to engage in their own novel mental model discourses and domain boundaries may widen, with niche densities proliferating and resource pools enriching as the battle for competitive supremacy intensifies.

During the fourth stage, the "institutionalization of market domains," industry recipes begin to appear, as market domains become reified and material transactions stabilize. Ambiguities and uncertainties are reduced as a result of actors' shared beliefs concerning how to compete successfully.[4] During this stage, entry costs increase substantially and mobility barriers and firm-specific isolating mechanisms continue to evolve, as firms develop specialist asset profiles.

THE EMPIRICAL STATUS OF COMPETITIVE ENACTMENT AND THE COGNITIVE LIFE CYCLE OF MARKET DOMAINS: A CRITICAL EVALUATION OF RECENT RESEARCH

With the exception of Porac et al.'s (1989) *inductive* Scottish knitwear study, outlined in the previous section, as far as the present author is aware, no other investigations, to date, have addressed directly the notion of competitive enactment. While the findings of this study provide a useful pre-

[4]Interestingly, a number of scholars concerned with the analysis of technological innovation and change, *per se*, are noting the importance of cognitive processes and actors' collective belief systems as a mediator of production organization, paralleling developments in the literature concerned with the analysis of business competition (see for example Clark & Staunton, 1989; Loveridge, 1992; Swan & Robertson, 1995).

liminary indication that the notion of competitive enactment and the associated cognitive life cycle conception have considerable potential as a foundation for further theorizing and model building, clearly there is a need for additional research, if these embryonic notions are to be subjected to adequate empirical scrutiny. However, before embarking on fresh work, it is useful to evaluate the extent to which the available evidence to be found within the limited (though rapidly expanding) existing literature on the cognitive analysis of competitive structures in general, supports the central tenets of this social constructionist approach.

Table I presents a summary of various published studies which have investigated competitive positioning strategy from a cognitive viewpoint. It is evident from this table that a wide range of techniques have been applied across relatively small numbers of research participants and participating organizations, in diverse settings, thus rendering problematic the extent to which we can meaningfully compare and contrast the findings from one study to another. However, such an exercise is essential, in order to gain clear insights concerning the extent to which significant progress has been achieved.

To this end, three propositions are advanced in this section of the paper, in order to provide a systematic basis for reviewing the extant literature. Each of these propositions, fundamental to the validity of the notion of competitive enactment, and the closely related notion of the cognitive life cycle, follow directly from the theory and research discussed in earlier sections. However, as we shall see, in each case, a careful review of the extant literature reveals that the available empirical evidence is found wanting.

Proposition 1. To the extent that competitive groups are detectable and there is significant variation in actors' cognitions across these groups, there will be detectable empirical linkages between measurable features of mental models of the competitive arena, or "competitive space," and measurable aspects of strategic behavior and organizational performance.

In their study of the Scottish knitwear industry, Porac et al. (1989) drew upon anecdotal and historical evidence in order to advance the claim that the beliefs of strategic decision makers about how to conduct their firms' activities were both the cause and result of their firms' strategic behaviors, with technical choices limiting their vision of the marketplace to that which had already been determined by existing beliefs. In other words, the shared beliefs of actors within the Scottish knitwear industry were both the cause and result of the emergence of a "competitive group" (i.e., the cognitive analogue of a strategic group). To the extent that strategic behaviors and organizational performance within industries vary systematically across competitive groups (i.e., to the extent that these preliminary

arguments are correct), we would expect to find statistically significant relationships between measurable features of actors' mental models of competitive space and measurable aspects of strategic behavior, the organization, its environment.

However, to date, virtually no studies have attempted to determine empirically the correlates of mental models of competitive space (see Table I). Only two studies, thus far, have attempted to explore directly the relationship between perceptions of competitive positioning strategy and organizational performance. In a study of some 19 organizations in the U.S., paints and allied products industry, Dess and Davis (1984) identified several strategic groups. The groups were identified using a structured questionnaire for classifying firms within Porter's (1980) well-known typology of generic strategies, administered to the CEO of each participating organization.[5] As noted in Table I, significant performance differences were observed between the groups, thereby providing moderate empirical support for the claim that there are empirical linkages between actors' cognitions of competitive positioning strategy and organizational performance across strategic groups. Unfortunately, however, data collection was confined to a single informant in each company (the CEO). The extent to which other managers within each organization are in basic agreement regarding the competitive position of their company is fundamental to the validity of this proposition. In order to investigate the validity of this proposition more adequately, further studies are needed, involving multiple informants from each participating organization.

More recently, Bowman and Johnson (1992) have conducted one such investigation. These researchers explored the extent to which the senior management teams from 35 businesses in a diverse range of sectors shared common perceptions of their own companies' strategies. This study em-

[5]Within this basic typology, organizations are classified within a two-dimensional space which identifies three generic strategies as potential bases for competitive success. Firms pursuing an *overall cost leadership strategy* seek to maximize efficiency through a set of functional policies aimed at achieving lower costs relative to competitors, though quality, service, and other facets of competitive strategy cannot be ignored. Firms pursuing a strategy of *differentiation*, by contrast, seek to create a product or service which is perceived throughout the entire industry as being unique. This strategy can be accomplished in a number ways, e.g., customer service, technology, or design or brand image. According to Porter (1980), firms pursuing this particular strategy should attempt to differentiate themselves along several dimensions. Firms pursuing the third strategy, *focus*, seek to serve a particular target group or segment rather than appeal to the market as a whole. In so doing, the aim is to achieve low-cost and/or differentiation vis-à-vis a narrow market target. Porter contends that each of these three generic strategies are viable alternatives. However, he also posits a fourth category, namely, "stuck in the middle." In contrast to the other approaches, this is an extremely poor strategic position to adopt. Porter contends that firms falling into this category are unlikely to succeed, due to the fact that they lack clear strategic direction. In recent years, however, the validity of this typology has increasingly been called into question (see, for example, Bowman, 1991a,b; Cronshaw, Davis, & Kay, 1994).

Table I. Outline Summary of Recent Cognitive Studies of Competitive Positioning Strategy

Study	Sample	Methodology	Principal conclusions	Comments
Bowman (1991a)/ Bowman and Johnson (1992)	Three hundred and nine senior managers from 35 businesses within various industries.	Structured questionnaire designed to assess the usage of various competitive methods related to Porter's (1980) generic strategies (adapted from Dess & Davis, 1984).	The extent to which managers are in agreement regarding their organizations' competitive positioning strategies varies considerably from one organization to another. In cases where agreement levels are low, differences in perceptions seem to be related to the current and historical functional roles of the research participants. The extent to which senior managers are in agreement within organizations is correlated with organizational performance.	Unfortunately the research design confounds consensus levels with industry sectors, thereby restricting the interpretation which can be placed on the findings.
Calori, Johnson, and Sarnin (1992)	Thirty-three managers (16 English and 17 French) from 4 industries (brewing, car manufacturing, retail banking, and book publishing).	Content analysis of semistructured interview transcripts in order to infer individual and collective mental models of the structure and dynamics of the industries.	Various qualitative and quantitative comparisons suggest that patterns of similarities and differences are discernible at both the industry and country levels of analysis. Differences between countries within a given industry appear to be more pronounced than between country differences *per se*.	Virtually the only study, thus far, which has attempted to compare mental models across multiple levels of analysis. Unfortunately, however, the sample sizes are too small, given the number of statistical tests performed on the data, with a very high probability that many of the findings are due to Type I errors. Furthermore, the research methods adopted may have accentuated surface-level differences in cognition at the expense of commonalties.
Calori, Johnson, and Sarnin (1994)	Twenty-six CEOs (14 English and 12 French) from 4 industries (brewing, car manufacturing, retail banking and book publishing).	Content analysis of semistructured interview transcripts in order to infer the complexity of the respondents' mental models of the structure and dynamics of their industries (i.e., a reanalysis of a subset of Calori et al.'s, 1992 dataset).	Weak-to-moderate relationships exist between cognitive complexity and the scope of the organization.	Virtually the only study, thus far, which has attempted to systematically relate measurable features of actors' mental models of the structure and dynamics of industries to measurable strategic behaviors. Unfortunately, however, the relationships observed may have attenuated due to the small sample size and a lack of control for various individual factors and firm-specific strategies.

de Chernatony et al. (1993)/ Daniels et al. (1993, 1994)	Twenty-four senior managers from 5 pump manufacturing companies and 17 customers from 10 companies (purchasing and engineering managers) within the off-shore pumps industry.	Free response listing of competitors in conjunction with cardsorts and repertory grid—for further methodological details see Daniels, de Chernatony & Johnson (1995).	Managers' mental models of competition are diverse rather than homogeneous. This diversity increases as functional and company boundaries are crossed into buyer/supplier relationships. Managers' ability to recognize one anothers' mental models follows a similar pattern, but recognition may be more widespread than cognitive similarity.	The relatively small sample sizes limit the extent to which the findings can be generalized within the immediate context of the study or, more generally, to other industries. Furthermore, the research methods adopted may have accentuated surface-level differences in cognition at the expense of commonalties.
Dess and Davis (1984)	Nineteen CEOs from firms within the paints and allied products industry.	Structured self-report questionnaire designed to assess the usage of competitive methods related to Porter's (1980) generic strategies.	Empirical support for the presence of strategic groups based on Porter's generic strategies. Significant performance differences were observed, between the various strategic groups, with firms identified with at least one generic strategy outperforming those identified as "stuck in the middle."	Data collection was confined to a single informant from each participating organization (the CEO). The extent to which other managers within these organizations are in basic agreement regarding their companies' competitive positioning strategies is untested, though fundamental to the validity of the claim that intra-industry stratification is a function of both structural parameters and top mangers' responses to perceptions of their environments.
Easton, Burrell, Rothschild, and Shearman (1993)	Comparative case studies of 4 industries (medical laser, temperature control, commercial vehicles, and tufted carpets). (Note: The numbers of participating firms and individual research particpants within each industry are not disclosed).	Semi-structured interviews analyzed primarily by "post-coding" the responses embedded within the transcripts (i.e., thematic content analysis of the verbatim statements of the research participants).	The extent to which perceptions of competitive structures are homogenized, is dependent on two interrelated factors, namely, the stage of development of the industry and the extent of heterogeneity in product, market, or technology. Only one industry (commercial vehicles) reflected the stability and predictability inherent in the notion of an "industry structure."	The scant details of the data collection and analysis methods preclude an adequate assessment of the reliability and validity of the findings. The fact that the data were gathered by five different interviewers, over differing time periods, may well account for the apparent lack of perceptual homogeneity in all but one industry (cf. Easton et al., 1993, p. 280).

Table I. Continued

Study	Sample	Methodology	Principal conclusions	Comments
Fombrun and Zajac (1987)	One hundred and fourteen of the largest firms in the U.S. Financial services industry.	Structured questionnaire survey.	Variables measuring managerial perceptions are useful predictors of strategic group membership.	Data collection was confined to a single informant from each participating organization (the CEO or some other senior manger). Consequently, the extent to which other managers within these organizations are in basic agreement regarding their companies' competitive positioning strategies is untested, though fundamental, to the validity of the claim that intra-industry stratification is a function of both structural parameters *and* top mangers' responses to perceptions of their environments.
Gripsrud and Gronhaug (1985)	Forty-three grocery retailers in a small Norwegian township.	Free response listing of competitors in conjunction with several structured questions regarding the informant's own organization and its most important competitor.	Strategists only perceive a modest fraction of "objectively" discernible competitors as important business rivals. An adequate assessment of the competitive structure of the retail industry, therefore, is difficult to make from "objective" market structure data alone.	
Gronhaug and Falkenberg (1989)	Seven informants from 4 organizations in the U.S. forest products industry.	Retrospective classification of own organization and its competitors over two time periods using Miles and Snow's (1978) typology.	Firms and their competitors differ greatly in their perceptions of competitive positioning strategy. The informants' perceptions were found to differ from the "objective" assessments of the researchers. None of the firms studied was found to change their strategies in response to environmental jolts.	Virtually the only study, thus far, to employ some form of longitudinal research design. However, the findings may be due to the extremely small sample size and the relatively crude methodology used for eliciting the informants' perceptions of competitive positioning strategy.
Hodgkinson and Johnson (1994)	Twenty-two informants from 2 organizations in the U.K. grocery retail industry.	Self-entry within-subjects variant of Porac and Thomas's (1987) taxonomic interview procedure.	Systematic variation in the structure and contents of the individual informants' mental models of the competitive structure of the industry, reflecting differences in the role responsibilities of their jobs.	The interview procedure adopted in this study may have accentuated surface-level differences in cognition at the expense of commonalties.

Porac, Thomas, and Emme (1987)	Seventy-seven owner-managers of grocery retail businesses in the Champaign-Urbana district of rural Illinois, U.S.	Top-down between subjects variant of Porac and Thomas's (1987) taxonomic interview procedure.	Decision makers make sense of competitive environments by means of cognitive taxonomies that summarize the similarities and differences among organizations. A five-level hierarchical taxonomy seems to capture the competitive structure of the grocery retail sector *within the vicinity of the study.*	The data collection method adopted in this study forces a hierarchical structure to emerge, thus rendering untestable the assumption that decision makers' mental models of competitive structures are organized hierarchically. This method is also questionable in terms of the way in which data from individual respondents is aggregated in order to generate the cognitive taxonomy (i.e., the investigation of variation in cognition from one respondent to another, or from one *subgroup to another,* is precluded by this particular method).
Porac and Thomas (1994)	Three samples of U.S. grocery retail managers: (1) N = 25, (2) N = 25, (3) N = 8.	A variety of rating tasks in order to identify the extent to *which* various subordinate categories within a hierarchical cognitive taxonomy of competitors exemplify the more general business category "retailer" and to what extent they represent a competitive threat to the research *participants' own* organizations—i.e., an extension of the study previously reported by Porac et al. (1987).	The results suggest that competitive boundaries are subjectively organized primarily *around a self-definition category,* with other categories having little perceived competitive impact, i.e., managers focus on a relatively narrow band of rival firms that are perceived to be most similar to their own organizations (cf. Hodgkinson and Johnson, 1994). These focal categories are located predominantly at an intermediate *level within the taxonomy thus* signifying a "competitive inflection point," i.e., subtypes above this level are seen as competitively nonoverlapping, whereas subtypes below this level are seen as equivalent in terms of competition.	As noted above, the data collection method adopted in the initial *phase of this study forces a hierarchical structure to emerge,* thus rendering untestable the assumption that decision makers' mental models of *competitive structures are organized hierarchically.* This method is also questionable in terms of the way in which data from individual respondents was aggregated in order to generate the cognitive taxonomy which was then presented as a given to the respondents who participated in later phases of the study.

Table I. Continued

Study	Sample	Methodology	Principal conclusions	Comments
Porac, Thomas, and Baden-Fuller (1989)	Seventeen top managers from within the knitwear industry (located mainly in the borders region of Scotland).	Top-down within-subjects variant of Porac and Thomas's (1987) taxonomic interview procedure.	Strategic decision makers within this industry share a strongly held collective mental model of the industry structure, which overrides individual and subgroup differences in cognition which may previously have existed, and has come to shape the strategic choices adopted by the various players.	Data analysis in this study was confined to an exploration of the communal beliefs of the full sample of research participants. The extent to which the informants' mental models differed in their structures and contents, at the individual or subgroup levels of analysis, was not investigated.
Porac, Thomas, Wilson, Paton, and Kanfer (1995)	(1) $N = 20$ managing directors (MDs) from 20 Scottish knitwear firms. (2) $N = 3$ industry experts from trade associations and technical schools. (3) $N = 89$ MDs.	(1) Field interviews in order to capture the "nomenclature" of the industry. This exercise incorporated taxonomic mapping using the top-down within subjects assessment method (Porac & Thomas, 1987). (2) The industry experts were consulted in order to help verify and interpret the information elicited from the interviews with the MDs. (3) Using information gathered from phases 1 and 2, above, a structured questionnaire was developed and subsequently administered to the sample of 89 MDs—i.e., a follow-up to the study previously reported by Porac et al. (1989).	A six-category model of organizational forms seems to capture actors' common perceptions of competition in the industry, with several attributes (principally size, technology, product style, and geographic location) forming the underlying basis for this commonly perceived structure.	The cross-sectional nature of the study prohibits causal inferences with regard to the material origins of the industry-level structure. The methods of analysis adopted preclude a full consideration of the extent to which actors' individual category structures deviate from the industry norm. Furthermore, the possibility of individual and subgroup differences in the salience of the attributes underpinning the collective cognitive structure identified at the industry level was not investigated.
Reger (1990)	Twenty-four strategists from 6 bank holding companies in the city of Chicago, U.S.	Factor analysis of data elicited by repertory grids.	A low level of agreement among the informants regarding the strategic dimensions underpinning competition. The findings suggest strategists have different cognitive frameworks. Researchers should proceed with caution, therefore, when selecting strategic dimensions for use in competitive positioning studies.	The research method adopted in this study in order to elicit the strategic dimensions may have accentuated surface-level differences in cognition at the expense of fundamental commonalties (cf. Reger and Huff, 1993).

Reger and Huff (1993)	As per Reger (1990) above.	Cluster analysis of data elicited by repertory grids (i.e., a re-analysis of Reger's, 1990 dataset).	A high level of agreement across the informants in terms of the clustering solutions (using multiple algorithms) suggesting perceptions of strategic group structure are widely shared by strategists within an industry, rather than each strategist holding unique perceptions of strategic group structure.
Reger and Palmer (1996)	Three samples, viz.: (1) as per Reger (1990), (2) as per Walton (1986), (3) N = 25 "upper echelon executives" from 6 banks and 5 "thrift" organizations in Arizona.	A retrospective comparison of findings drawn from 3 separate studies each conducted within the U.S. financial services industry, over differing time periods.	The findings broadly support the cognitive inertia hypothesis, i.e., strategists' mental maps failed to keep pace with the major changes experienced by the industry.
Walton (1986)	Twenty-two senior managers from nationally prominent firms within the insurance, securities, savings banking, and commercial banking sectors of the U.S. financial services industry (New York City).	Multidimensional scaling analysis of attributes, elicited using repertory grid (separate analyses were performed for subgroups of managers from each sector).	Differing attribute structures emerged for each of the 4 subgroups, suggesting that prototypes of what it takes to be successful vary by industrial sector.

Virtually the only investigation, thus far, to employ some form of longitudinal research design. While the data from the 3 studies were gathered over differing time periods, unfortunately, several locational and industry segment disparities, together with key differences in the data analysis methods employed, confound several of the outcomes otherwise attributable to environmental turbulence.

The apparent cognitive diversity observed may be due to the very small number of research participants in each subgroup. Furthermore, the interview task used to elicit the attributes may have accentuated surface-level differences in cognition at the expense of fundamental commonalties.

ployed a modified version of the structured questionnaire originally devised in the aforementioned Dess and Davis (1984) study. The findings revealed that the extent of consensus within senior management teams, regarding the competitive positioning strategy of their organizations, was correlated with organizational performance. Unfortunately, however, due to the fact that this study was conducted over a wide range of industries, rather than within a single sector, it is not possible to infer from the results whether or not consensus levels *per se*, vary systematically from one industrial sector to another, let alone within sectors, i.e., the research design confounds the effect of organizational consensus with sector and so it is not possible to determine whether the variations in consensus observed are due to the differing industry contexts in which the firms operate, or whether the results are due to the background characteristics of the particular respondents and/or their organizations (c.f. Dess, 1987).

Only one study, thus far, has been published which has explored the linkage between measurable features of actors' mental models of competitive structures and measurable aspects of strategic behavior. Calori, Johnson, and Sarnin (1994) reported a study which examined the extent to which the degree of complexity associated with CEOs' cognitive maps of the structure and dynamics of their industries correlated with the scope of the organization in terms of the business portfolio of the firm, its geographic scope, and the extent to which the firm had links with foreign parent organizations. Partial support was obtained for the hypothesis that the complexity of CEOs' cognitive structures matches the complexity of the environment. Unfortunately, however, only relatively modest amounts of variance were explained with relatively low levels of statistical significance. As the authors themselves acknowledge, this is probably due to the small size of the sample (just 26 cases from four industries across two countries) and from a lack of control for various individual factors and specific firms' strategies.

Nevertheless these findings illustrate the potential value of studies which seek to determine empirically the correlates of mental models of competitive positioning strategy. Further research which seeks to explore systematically the empirical relationships between mental models of competitive space and strategic behavior and organizational performance is badly needed.

Proposition 2. As industries evolve through the various stages of their life cycles, actors' mental models of competitive space converge to form highly unified perceptions of reality.

As we have seen, Porac and his associates contend that it is the convergence of actors' beliefs, over time, which enables the creation and maintenance of stable transactional networks within the marketplace.

Eventually, this process of perceptual convergence leads to the development of a widely shared set of assumptions and beliefs throughout the community of firms concerning "the right way" in which to compete. At this stage, as predicted by population ecology theorists (e.g., Hannan & Freeman, 1977, 1988), and adherents of the conventional life cycle approach (e.g., Porter, 1980) a shake out occurs, as previously lucrative niches become overpopulated.

To the extent that this theorising is correct, we would expect to find evidence of varying degrees of belief similarity among knowledgeable actors, as industries pass through the various stages of the life cycle. As Porter (1980, p. 215) observes, the definitive characteristic of an emerging (or reformed) industry, is that there are no established "rules of the game." Consequently, during the introduction/emergence stage of the conventional life cycle approach, as advanced by Porter (1980), or the preliminary "pre-competitive knowledge development" phase and the "concept formation" phase, as espoused by Levenhagen et al. (1993), we would expect to find relatively low levels of belief similarity among actors, possibly even within the same organization, concerning bases of competition and/or which firms pose the greatest competitive threat. Conversely, at the other end of the spectrum, during later stages of the life-cycle ("maturity" and "decline" in Porter's terms, or "institutionalization of market domains" in the language of Levenhagen and his associates), we would expect to find relatively high levels of belief similarity, with widespread agreement among actors within and between organizations concerning bases of competition and which firms pose the greatest competitive threat, with intermediate degrees of belief similarity among actors operating within industries characteristic of intermediate stages (c.f. Easton et al., 1993).

In order to establish the validity of this proposition, it would be necessary to compare and contrast the mental models of multiple actors with one another, preferably across a number of different levels of analysis.[6] However, in both the Scottish knitwear study (Porac et al., 1989), and their

[6]Ultimately, in order to assess the validity of the perceptual convergence hypothesis as an explanation of the evolution of competitive structures, we require longitudinal studies in which the extent of convergence is systematically monitored over time as industries pass through the various stages of the industry life cycle. Alternatively, though somewhat less satisfactory, researchers could investigate the extent of convergence across several industries, each at differing stages in the life-cycle, in a comparative fashion. Recently, Easton et al. (1993) have reported one such study. While the findings appear to offer favorable support for this hypothesis, these researchers were not concerned directly with developing a cognitive perspective, as such. Accordingly, they did not seek to formally represent their research participants' mental models of competitive structures. Rather, data collection and analysis were restricted to a selective reporting of verbatim transcripts of interviews held with a number of managers within the various industries studied, without recourse to formal cognitive mapping techniques (c.f. Calori et al., 1992).

seminal study of urban retailers in rural Illinois, U.S. which preceded it (Porac et al., 1987), Porac and his associates restricted their analyses to the industry-level of aggregation. In neither case did they consider the extent to which their research participants might differ from one another in their mental models of competitive space (see also Porac & Thomas, 1994).

In their earlier study of American retailers, Porac and his associates adopted an interview technique which enabled them to represent the aggregate views of their sample as a whole, but not the views of individual research participants. In the Scottish knitwear study, by contrast, they collected adequate data to study the individual research participants' mental models, but elected instead to focus their attention on the communal aspects of their data:

> In our analysis of the Scottish knitwear sector we took intra-industry variation as a given. At the same time, however, we sought to distil from interview and secondary data core beliefs that seemed to be repeated by our sources and widely accepted. Our analyses suggest that certain beliefs about competitor and market identity isolate a commonly perceived competitive arena for many of the Scottish managers. (Porac et al., 1989, p. 405)

The approaches to data analysis adopted in these studies are clearly predicated on the assumption that there are high levels of consensus among strategists within and between organizations in particular industries and markets concerning the bases of competition, who the key players are, and how they are positioned *vis-à-vis* one another.[7] While the results undoubtedly demonstrate the potential value of cognitive analysis (Thomas & Venkatraman, 1988; Porac & Thomas, 1990), there is a growing number of studies, the findings of which must lead us to question the extent to which, even within well established industries, this underlying assumption of consensus is valid (for details see Table I).

In her study of competition in the Chicago banking market, for example, Reger (1990) investigated the mental models of senior managers from a number of rival firms, at the individual-level, in order to explore the extent to which the research participants were in agreement regarding the bases of competition, and concluded as follows:

> A surprisingly low level of agreement as to the important strategic dimensions was found in this industry... . The results shown do not support the proposition that key strategic dimensions will be widely shared by strategists in an industry... . It may be that subgroups of strategists in the industry share more commonality of dimensions

[7]More recently Porac et al. (1995) have reported the findings of a larger-scale follow-up investigation of the Scottish knitwear industry study. While recognizing the importance of the role of differences in perceptions, especially asymmetries in the classification of firms into particular categories of rival, once again the analysis centers largely on commonalities with a view to identifying "a collectively understood industry model of organizational forms ... [which] ... has become part of the macrocultural belief system of the industry participants" (p. 221).

> than exhibited by the group as a whole. In particular, two subgroups are likely to share more commonality. First, members of the same BHC (bank holding company) might be expected to share more common dimensions because they interact more often with each other and are more likely directly to discuss competitors' strategies and key strategic dimensions in the industry. Second, strategists who share similar functional or product backgrounds are likely to share common dimensions because their training and experiences are similar and these may have shaped their cognitive constructive systems in similar ways. (Reger, 1990, pp. 77-79)

Preliminary supporting evidence for these hypotheses has been obtained in two recent studies by Johnson and his associates conducted in the off-shore pumps industry (Daniels et al., 1993, 1994) and the U.K. grocery retail industry (Hodgkinson & Johnson, 1994). As in Reger's study, the findings suggest that there is considerable variation among managers in terms of their views of the way in which their industries are structured. However, the results also indicate that managers within particular organizations share more similar views than managers across organizations and that managers with common functional and/or role responsibilities are more similar in their views compared to their counterparts with differing functional and/or role responsibilities.

Hodgkinson and Johnson's (1994) study uncovered evidence which suggests that the degree of detail (structural complexity) associated with mental models of competitive structures may vary systematically according to the role requirements of the strategist's job. Managers whose roles require them to have a more detailed grasp of the business environment (for example those concerned with the formulation of national merchandising policy at head office), were found to have significantly more elaborate cognitive structures, in comparison to their counterparts whose roles do not require them to possess such detailed insights and knowledge concerning the actions of their competitors (for example regional area managers concerned with the implementation of head office policy in the field). Hodgkinson and Johnson contend that these differences in the structures and contents of their research participants' mental models have arisen due to the fact that differing jobs place differing demands upon individuals and subgroups, which in turn, result in differing interpretations of the competitive arena (cf. Calori et al., 1994).

Unfortunately, however, there is a methodological problem which undermines our ability to draw firm substantive conclusions regarding the extent of belief similarity/dissimilarity from these studies. This concerns the methods used to elicit and represent the research participants' mental models of the competitive environment.

As indicated in Table I, the majority of studies which have sought to discover the extent to which actors' mental models are homogeneous or diverse—in terms of their structures and contents—have tended to use methods of data collection and analysis which are unsuitable for exploring

this particular issue. Studies which have revealed diverse mental models of competitive structures have, on the whole, tended to use research methods which, by their very nature, may accentuate surface-level differences in cognition at the expense of fundamental commonalties. Consequently, it is difficult to ascertain the extent to which the observed differences in cognition are due to the characteristics of the industry under study, the characteristics of the research participants and participating organizations, or the research methods employed in order to gather and analyze the data.

The common methodological limitation associated with these studies, is that the various techniques employed in order to elicit the respondents' mental models necessitate extensive interactions between the investigator(s) and the research participants. During the course of these interactions there is ample opportunity for a range of factors associated with the dynamics of the interview (chiefly the length of the interview, and the behavior of the interviewer and interviewee) to influence the outcomes of the study (cf. Calori et al., 1994). In other words, the application of each of these techniques may lead research participants to generate idiosyncratic responses which may be a function of the demand characteristics of the data collection task, rather than a reflection of underlying substantive differences in cognition. The extent to which the respondent is willing to generate further, more detailed responses (additional constructs, further categories/subcategories, etc.), may be determined by such factors as how much time he or she has available to continue with the task, the extent to which they are motivated to elaborate their previous responses and the extent to which the interviewer presses for further elaboration, either overtly, or by means of relatively subtle nonverbal cues. In short, the cognitive diversity observed by Reger (1990), Daniels et al. (1993, 1994), and Hodgkinson and Johnson (1994), among others, may be due in no small part to the dynamics of the interview and associated methods used to elicit and represent the research participants' mental models.

A further problem confronting researchers seeking to establish the extent to which actors' mental models are similar or different to one another, is the difficulty of comparing one mental model with another, in terms of their structures and contents, a problem which intensifies with increased numbers of research participants and levels of analysis. Which particular features should form the basis of such comparisons and how should the necessary analysis be performed?

The answer to this question is nontrivial and, ultimately, the decision as to which particular feature(s) should form the focus of the analysis may prove to be the crucial deciding factor which determines the outcomes of a given study. This can be illustrated by reference to Reger's (1990) study of the Chicago banking market.

As we saw earlier, Reger (1990) found considerable variation in terms of the dimensions underpinning perceptions of competitive space elicited from managers from different banks within the Chicago area and (on the basis of a series of factor analyses), concluded that there were low levels of agreement amongst strategists in the banking industry regarding the important dimensions defining the bases of competition. More recently, however, Reger and Huff (1993) reanalyzing the same dataset (using a variety of cluster analysis techniques), have noted considerable agreement in terms of the research participants' categories of competitors. On the basis of this reanalysis, Reger and Huff conclude that the findings of their study offer complementary support for Porac et al.'s (1989) and Porac and Thomas's (1990) view, as outlined earlier in this paper, namely, that there is a cognitive basis for forming strategic groups (see also Bogner and Thomas, 1993). Clearly this interpretation of the results is somewhat at variance with Reger's (1990) initial conclusions that strategists have different cognitive frameworks, and serves well to illustrate the fact that the comparative evaluation of data across individuals in cognitive studies of competitive positioning strategy is far from straightforward.

Notwithstanding these methodological limitations, there are important implications arising from this group of studies for the analysis of competitive structures from a cognitive viewpoint. Clearly, these findings call into question the validity of the assumption of consensus which has underpinned the development of the notion of competitive enactment and the associated cognitive life cycle approach, and informed the research design and analysis of the data associated with the earlier studies upon which these notions are based. At the very least, researchers should reconsider the nature and status of aggregate mental models, which have been derived taking the industry-level as the focal unit of analysis (c.f. Walsh, 1995). As Hodgkinson and Johnson (1994) observe, the findings of studies showing low levels of belief similarity, point overwhelmingly to the need for researchers to search more systematically for patterns of difference in cognitive structures as well as patterns of similarity. If we are to understand managerial process at the cognitive level, then we need to understand better the multiple influences giving rise to consensus/disensus in managerial groups. Understanding the processes leading to consensus/disensus has implications for strategic decision making, for the management of change, for managing across functional, business unit or national boundaries, or indeed for any area of management in which the reconciliation of cognitive diversity is of importance.

Proposition 3. As industries evolve through the various stages of their life cycles, actors' mental models of competitive space become increasingly stable.

This proposition follows directly from juxtaposing the notion of the cognitive life cycle advanced by Levenhagen et al. (1993) with the findings of the earlier Scottish knitwear study (Porac et al., 1989). The notion of the cognitive life cycle, and the earlier associated notion of competitive enactment, imply that the reason businesses (or indeed entire industries) ultimately may fall into decline, is due to the inability of strategists to revise their mental models sufficiently quickly to adapt successfully to a changing environment. As Levenhagen et al. (1993) observe, a key danger, as material transactions stabilise to the extent that market domains become reified and industry recipes begin to appear, is that actors may become overly dependent on the shared mental model that has come to prevail, to the extent that their perceptions of what it takes to compete effectively become out of step with the changing material conditions of the marketplace (see also Porac & Thomas, 1990; Senge, 1990; Baden-Fuller & Stopford, 1992).

Population ecology theorists such as Hannan and Freeman (1977, 1988), contend that inertial forces often prevent organizations from adapting to environmental change. As Porac and Thomas (1990) observe, one possible source of such inflexibility is the cognitive inertia arising from strategists' mental models of the competitive arena. In circumstances where environmental contingencies shift and new forms of competitive strategy emerge to challenge an organization's once protected position, concomitant changes in the way in which strategists view competition would appear to be a fundamental prerequisite for successful adaptation. However, as noted by Porac and Thomas, the literature abounds with anecdotal evidence which suggests all too often strategists are unable to reconceptualize the market identity of their businesses in this way, with drastic consequences for the firms concerned.

The notion of cognitive inertia implies that, to a certain extent, firms experiencing a down-turn in their business may actually perpetuate this state of affairs, due to the inability of strategists to revise their mental models of competitive space sufficiently quickly to adapt successfully to the changing environment. In order to test this proposition, however, there is clearly a need for longitudinal studies which monitor actors' mental models of competitive space, market conditions, and strategic behavior and organizational performance, over time. Only then can we ascertain what role (if any) these mental models actually play in facilitating and/or inhibiting strategic change in dynamic environments.

Unfortunately, such studies have not been forthcoming. The author is aware of only two studies, concerned with the analysis of competitive positioning strategy from a cognitive viewpoint, which have employed some form of longitudinal design. In a study of the forest products industry, Gronhaug and Falkenberg (1989) compared senior managers' perceptions

of their own and competitors' strategies, during periods of growth and recession ('boom and bust'). However, this study focused on just seven respondents from four organizations and employed a retrospective design, i.e., the informants were required to report their cognitions for the periods of interest on the basis of recall.

The organizations, selected from the Fortune 500 list of the largest U.S. industrial firms, were pursuing strategies which emphasized wood products over pulp and paper. Multiple sources of data were used, including semistructured interviews with top management, questionnaires, company reports, and articles from relevant business periodicals. Competitive positioning strategy was operationalized in terms of Miles and Snow's (1978) fourfold typology.

Following Miles and Snow's (1978) original procedure, the participants were each presented with a basic description of the four strategic types and requested to classify their own firms and the three competitors as to type, retrospectively, over the two time periods covered by the study. Each of the four firms were also classified by the researchers for both time periods, in order to provide an additional basis of comparison. According to Gronhaug and Falkenberg, great discrepancies were observed in relation to the self-evaluations and competitors' evaluations of the firms' strategies, with no changes in strategies reported by the firms themselves, despite the fact that such changes were observed by their competitors.

Although this study is based on an extremely limited sample, it clearly illustrates the potential value of longitudinal research in this field of inquiry and points overwhelmingly to the need for further studies using *prospective* designs with a greater sophistication of analytical methods and larger sample sizes.

More recently, Reger and Palmer (1996) have attempted to compare longitudinally, over a 9-year period, executives' cognitive maps of competitive positioning in the U.S. financial services industry. The findings of this research provide broad support for the validity of the cognitive inertia hypothesis. Considerable upheavals were experienced by the American financial services industry throughout the period encompassed by this research, following extensive deregulation and other changes. However, according to Reger and Palmer, due to inertia, strategists' mental maps failed to keep pace with this changing environment.

As with the Gronhaug and Falkenberg study, however, there are several methodological weaknesses associated with the design of this research which render the findings inconclusive. In order to explore the extent to which mental models altered over the 9-year period encompassed by this research, Reger and Palmer compared retrospectively the findings from three *separate* studies by means of a qualitative content analysis.

While the data were gathered over differing time periods (1981, 1986, and 1989), as Reger and Palmer themselves acknowledge, there are several locational and industry segment disparities across the three studies. These potentially confound a number of outcomes which Reger & Palmer would otherwise have been able to attribute with much greater certainty to increasing environmental turbulence. Furthermore, there are several differences in the data analysis methods employed within each study which might also account for some of the outcomes.

As in the case of the Gronhaugh and Falkenberg study, these findings highlight a pressing need for further studies using *prospective* designs, with a greater sophistication of analytical methods and larger samples—both in terms of the number of individual research participants and the number of participating organizations.

CONCLUDING REMARKS

This review has identified a number of significant issues and themes within the rapidly expanding literature on the cognitive analysis of competitive positioning strategies which require substantial empirical analysis. The notion of competitive enactment and the associated cognitive life cycle conception represent a potentially significant breakthrough in terms of their contribution to our understanding of business competition. However, this review has identified several gaps within the limited empirical knowledge base that has accumulated, thus far, which necessitate further inquiry, if this potential is to be realized.

Three empirically testable propositions in particular have been derived, for which the existing evidence is either severely limited, from a methodological point of view, or nonexistent. As we have seen, the findings of a number of recent studies have begun to accumulate which, on the face of it, would seem to contradict the predictions of these embryonic theoretical notions. However, this review has demonstrated that these studies are beset by a number of methodological shortcomings which render the substantive meaning of their results equivocal.

Much of the recent research within this topic area has been dominated by small-scale exploratory investigations, designed primarily to assess the viability of particular methodological approaches for revealing insights into how strategists view their competitive worlds. However, this field of inquiry is approaching a new phase in its development. We have reached the stage where the time has come to move beyond such small-scale inductive exploratory work, towards larger-scale hypothetico-deductive theory testing, if further significant progress is to be achieved.

Each of the substantive issues raised in this review pose methodological challenges which warrant immediate attention if the notion of competitive enactment and the associated cognitive life cycle conception are to be submitted to adequate empirical scrutiny. Three problems in particular are impeding our immediate progress.

First, the time has now come for researchers to move beyond the stage where actors' mental models of competitive space are studied for their own sake (on the basis of the largely untested assumption that they are somehow related to strategic behavior and organizational performance.) While significant progress has been achieved in refining techniques for the analysis of mental models of competitive structures *per se*, virtually no attempts have been made to develop indices which would enable researchers to relate actors' cognitions of competitive positioning strategy to other variables of theoretical interest.

Second, there is the unresolved issue regarding how researchers should move between levels of analysis in studies of competitor cognition. As we have seen, the majority of researchers have concentrated their efforts at a given level of analysis within particular studies, initially at the level of the industry, with a view to identifying shared belief structures of competitive space, but more recently at the level of the individual research participant, with a view to exploring patterns of similarity *and* diversity within and between particular subgroups of research participants. However, if recent theory is to be subjected to adequate empirical scrutiny, we need to engage in multilevel studies, in which actors' cognitions are compared and contrasted systematically, in a multilayered fashion. Unfortunately, existing methods of data collection and analysis are unable to meet this fundamental requirement.

The final, and arguably the most complex, set of issues is related to the problem of how actors' mental models should be compared with one another (Huff & Fletcher, 1990). Which features of the data should form the basis of such comparisons and how should the data be analyzed?

Before concluding, it is worth noting that virtually all of the studies surveyed in this review have been conducted using samples of "industry-insiders," typically middle-ranking and senior managers from rival firms. While studies of such informants, located on the "supply-side" of transactional networks, represent a useful point of departure for developing and testing evolutionary theories and models of competitive structures in industries and markets, there is a pressing need to extend the nature and scope of empirical research in this field of inquiry, to incorporate comparisons of actors' conceptions of competitive space located on the "demand side" of transactional networks, i.e. customers (cf. de Chernatony, 1989; Daniels et al., 1993). As recently noted by Hodgkinson, Tomes, and Padmore (1996), should it transpire that there are fundamental discrepancies in the structures and/or contents of the mental models of key stakeholder subgroups drawn from across the supply and de-

mand sides of transactional networks, such a finding might yield rich insights into the mechanisms of market failure. This would imply a potentially serious state of affairs in which the key parties are operating from fundamentally different frames of reference. On the other hand, the discovery of a strong convergence of mental models amongst groups of actors located across both the supply and demand sides of transactional networks, while suggestive of potentially well protected market niches (by virtue of significant perceptual barriers to entry and mobility), might also signal potentially serious problems due to cognitive inertia. Under such conditions, either or both parties might fail to adapt sufficiently quickly, in the face of significant changing market conditions (e.g., major product and/or service innovations), to reap the associated benefits of such change.

This line of inquiry might profitably be extended still further, by exploring the mental models of knowledgeable "industry-outsiders" such as consultants and academics, in an attempt to gain richer insights into the evolution of competitive structures in industries and markets (cf. Snow & Hambrick, 1980; Chen, Farh, & Macmillan, 1993). For example, discrepancies in the structures and contents of the mental models of industry/market insiders and outsiders might reveal new insights regarding the competitive blind spots of the former group of stakeholders.

The overwhelming conclusion to be drawn from this review is that there are considerable methodological and empirical hurdles yet to be confronted if the theoretical notions discussed are to be tested with an acceptable degree of rigor. It is to be hoped that this review will stimulate further the scholarship and debate much needed to meet the challenges facing this highly exciting and rapidly developing field of inquiry.

ACKNOWLEDGMENTS

The author is grateful to Kevin Daniels, Phyllis Hughes, Roy Payne, and two anonymous referees of *Human Relations* for their helpful and constructive comments on an earlier version of this paper.

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