WHAT HAVE WE LEARNED ABOUT GENERIC COMPETITIVE STRATEGY? A META-ANALYSIS

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The dominant paradigm of competitive strategy is now nearly two decades old, but it has proved difficult to assess its adequacy as a descriptive system, or progress its propositions about the performance consequences of different strategic designs. It is argued that this is due to an inability to compare and cumulate empirical work in the field. A meta-analytic procedure is proposed by which the empirical record can be aggregated. Results suggest that, although cost and differentiation do act as high-level discriminators of competitive strategy designs, the paradigm's descriptions of competitive strategy should be enhanced, and that its theoretical proposition on the performance of designs has yet to be supported. A considerable agenda for further work suggests that competitive strategy research should recover something of its former salience. Copyright © 2000 John Wiley & Sons, Ltd.

INTRODUCTION

Michael Porter's theory of generic competitive strategy is unquestionably among the most substantial and influential contributions that have been made to the study of strategic behavior in organizations (Porter, 1980, 1985). In essence, the theory contains two elements: first, a scheme for describing firms' competitive strategies according to their market scope (focused or broad), and their source of competitive advantage (cost or differentiation); and, second, a theoretical proposition about the performance outcomes of these strategic designs: that failure to choose between one of cost- or differentiation-leadership will result in inferior performance, the so-called 'stuck-in-the-middle' hypothesis.

Within a few years of publication, the theory was recognized as the dominant paradigm of competitive strategy (Hill, 1988; Murray, 1988). But, despite widespread interest and application, it has proved difficult to progress its representation of competitive behavior. In Kuhn’s account, a paradigm gives a common platform and focus to subsequent empirical and theoretical investigation; it defines the scope of phenomena that are deemed to be important, and the methods used for investigation; and it becomes the received wisdom that is taught in the subject's textbooks (Kuhn, 1962). In the following paragraphs it will be shown that Porter's theory has played all these roles.

But it is the thesis of this paper that the paradigm has so far failed to open up a period of Kuhnian 'normal science,' in which a detailed and immensely productive dialogue is established between fact and theory. Failure to establish this dialogue threatens to leave the study of competitive strategy in a pre-paradigm state, as no more than a series of brave beginnings, none of which attract sufficient empirical or social support to make the phase transition to normal science. The

Key words: generic strategy; competitive strategy; meta-analysis

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CCC 0143-2095/2000/020127-28 $17.50
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Received 5 August 1996
Final revision received 30 July 1999
impediment has been that there is no known way to compare or cumulate individual empirical studies of the type suggested by the paradigm. It is the objective of this paper to remove this impediment.

**The dominant paradigm**

The widespread acceptance of Porter's descriptive scheme by researchers can be seen in the wide range of its application. These include industries as diverse as shipping (Brooks, 1993), banking (Meidan and Chin, 1995), and hospital services (Kropf and Szafran, 1988); and countries as diverse as Ireland (McNamee and McHugh, 1989), Portugal (Green, Lisboa, and Yasin, 1993), Korea (Kim and Lim, 1988), and the People's Republic of China (Liff, He, and Steward, 1993).

The scheme has also been widely used by researchers studying relationships between firms' competitive strategy and other aspects of management: i.e., their human relations strategy (Schuler and Jackson, 1989); information technology (Huff, 1988); industrial engineering (Petersen, 1992); manufacturing strategy (Kotha and Orne, 1989); logistics (McGinnis and Kohn, 1988); environmental scanning (Jennings and Lumpkin, 1992); planning processes (Powell, 1994); management selection (Govindarajan, 1989; Sheibar, 1986); and managerial biases in perceptions of competitive strategy (Nystrom, 1994). The framework has also been used extensively in practice to structure managers' perceptions about their firm's strategy. With few exceptions (Bowman and Johnson, 1992), such applications are rarely reported.

The paradigm's theoretical propositions have also attracted intense debate. Early challenges to the 'stuck-in-the-middle' hypothesis (Karnani, 1984; Murray, 1988; Hill, 1988) argued that conditions which might favor cost-leadership (such as the reduction of transaction costs through vertical integration, process innovation and learning, and scale effects) were independent of conditions that might favor differentiation (such as consumer preferences, product innovation, and quality differentiation based on a firm's superiority in a particularly complex value system). Hence, external conditions provide no a priori reason to discriminate against mixed cost- and differentiation-strategic designs (Murray, 1988). Moreover, in conditions where differentiation strategies can be used to expand market share, and this in turn permits greater capture of economies of scale and scope, external conditions might actively favor mixed strategies (Hill, 1988; Phillips Chang, and Buzzell, 1983). Conditions that have been considered in this way include the particular nature of retailing as against manufacturing industries (Cappel et al., 1994); and the distinctive characteristics of an industry's technology (Oskarsson and Sjoberg, 1994).

Beginning with Hambrick (1983), a series of studies has also begun the task of exploring the paradigm's empirical validity. These have followed the paradigm's guidance to describe generic strategies as polythetic gestalts or designs (Miller, 1981; Hambrick, 1984; Rich, 1992), a task best undertaken using principal components analysis and cluster analysis (Hambrick, 1984; Harrigan, 1985; Mcgee and Thomas, 1986). However, these techniques result in classifications that are specific to the sample of participating firms and cannot be cumulated with other findings. Thus, it has not been possible to assess the accumulated weight of evidence on what generic competitive strategies look like in practice, nor how closely they accord with the paradigm's descriptive and theoretical elements. The study of competitive strategy is thus currently stuck in something of a dead-end of its own design.

Compounding these difficulties, there have evolved a number of different interpretations of the dominant paradigm's descriptive system, so that the paradigm's descriptive and theoretical propositions may take a number of forms. To date, these have not been systematically compared.

As a result of this impeded dialogue between paradigm and empirical investigation, the paradigm's descriptive scheme for describing competitive strategy has barely progressed in the two decades since it was first proposed. Attempts by Miller (1986) and Mintzberg (1988) to widen the set of strategic competitive behaviors that are held to be 'generic' have met with little success, despite recent empirical evidence which suggests that they offer a superior description of competitive behavior (Kotha and Vadlamani, 1995). Porter's scheme remains unaltered as the typology set out in most contemporary textbooks (Thompson and Strickland, 1995; Pearce and Robinson, 1994; Bourgeois, 1996).

The study reported in this paper was accord-
INGLY MOTIVATED TO DEVELOP META-ANALYTIC PROCEDURES WITH WHICH TO AGGREGATE EMPIRICALLY DERIVED DESCRIPTIONS OF GENERIC COMPETITIVE STRATEGY. STUDY ONE REPORTS A META-ANALYSIS OF THE PRINCIPAL COMPONENT SOLUTIONS IN THE EMPIRICAL RECORD; STUDY TWO REPORTS A META-ANALYSIS OF CLUSTERED CATEGORIES OF COMPETITIVE STRATEGY DESIGN. THE RESULTING AGGREGATES ARE COMPARED TO ALTERNATIVE INTERPRETATIONS OF THE CLASSIFICATION SYSTEM OF THE DOMINANT PARADIGM. STUDY THREE USES THESE AGGREGATE DESCRIPTIONS TO ASSESS THE PARADIGM'S THEORETICAL PROPOSITIONS ON THE PERFORMANCE OF GENERIC COMPETITIVE STRATEGIES. TO BEGIN, ALTERNATIVE INTERPRETATIONS OF THE DOMINANT PARADIGM AND ITS PROPOSITIONS ARE DISCUSSED AND FORMALIZED.

INTERPRETATIONS OF THE DOMINANT PARADIGM

Describing competitive strategy

ALL THEORY BUILDING REQUIRES A PARSIMONIOUS WAY TO DESCRIBE THE INTRACTABLE VARIETY OF NATURE. THIS SECTION EXAMINES THE FOUR APPROACHES THAT HAVE BEEN USED TO INTERPRET THE DOMINANT PARADIGM'S DESCRIPTIVE SYSTEM.

The taxonomic interpretation


THE ORDER IN WHICH ALLOCATION RULES ENTER INTO THE HIERARCHY IS SHOWN IN FIGURE 1. AT THE TOP IS THE PARADIGM'S DISTINCTION BETWEEN DESIGNS THAT PLACE DISTINCTIVE EMPHASIS, RELATIVE TO COMPETITORS, IN PURSUING SOME SOURCE OF ADVANTAGE, AND DESIGNS THAT SPREAD THEIR EFFORTS MORE EVENLY AND BECOME STUCK-IN-THE-MIDDLE. THE PARADIGM'S THEORY OF PERFORMANCE IS BASED ON THIS HIGHEST-LEVEL DISTINCTION. WITHIN THE CLASS OF DISTINCTIVE EMPHASIS DESIGNS, PORTER'S EMPHASIS ON THE COST/DIFFERENTIATION DICHOTOMY AS 'TWO BASIC TYPES OF COMPETITIVE ADVANTAGE,' AND AS 'FUNDAMENTALLY DIFFERENT ROUTE(S) TO COMPETITIVE ADVANTAGE' (PORTER, 1985: 11), SUGGESTS THAT THIS ALLOCATION RULE BE PLACED ABOVE MARKET SCOPE IN THE RULE HIERARCHY.


These key features of the taxonomic interpretation are set out in Table 1, and stressed in the following proposition:

Proposition 1a: All competitive-strategy designs can be precisely allocated to a number of hierarchically ordered classes on the basis of (i) whether or not a design has some distinctive emphasis relative to competitors; (ii) whether that emphasis is towards cost- or differentiation-advantage; and (iii) the market scope adopted. Only a very small number of mixed-emphasis designs will exist.

The empiricist interpretation

This second interpretation relaxes the restrictions of taxonomy. The approach is best typified in an extensive series of studies by Danny Miller, including studies of competitive strategy (Miller, 1992b; Miller and Friesen, 1986a, 1986b). The approach retains the assumption that the very large number of firm-level competitive-strategy designs can be reduced to a smaller number of classes (Miller, 1981), but it differs from a taxonomic interpretation in four ways (Table 1).

First, it is no longer asserted that all designs can be so classified, just that a 'large proportion' can (Miller, 1986: 235). Room is left for idiosyn-
cratic designs to flourish around the more commonly observed classes. Secondly, the allocation of each individual design to a class is no longer determined exactly by a precise set of allocation rules, but is in part stochastic. This uncertainty can be reduced with more refined classification, so that a balance must be struck between a larger number of more homogeneous classes, and a more parsimonious, but possibly less meaningful, classification (Doty and Glick, 1994; Hambrick, 1984; Miller, 1981). Thirdly, although all empirically derived clusters are associated together in hierarchies of similarity, an empiricist interpretation does not impose an ex ante requirement that cost and differentiation be high-level discriminators in that hierarchy. Finally, the empiricist interpretation does not anticipate a near-prohibition on mixed-emphasis designs, ex ante, but rather allows whatever common designs exist to emerge from the data.

This less restrictive interpretation of the dominant paradigm can be summarized as follows:

**Proposition 1b:** Most competitive-strategy designs can be meaningfully allocated to a number of classes on criteria that include whether or not a design has some distinctive emphasis relative to competitors; whether that emphasis is towards cost- or differentiation-advantage; and the market scope adopted.

The nominalist interpretation

In this view, generic competitive strategies are taken to represent ideal "types," and the $2 \times 2$ classification system of the dominant paradigm is interpreted as a general typology (Doty and Glick, 1994).

Correspondence between real designs and ideal types will be both imperfect and variable (Mayr, 1969; Rich, 1992), so that classifications will be neither fully homogeneous nor mutually exclusive (Table 1). Also, the nominalist interpretation does not require the four ideal types to be collectively exhaustive. To the contrary, and unlike all other interpretations of the dominant paradigm, the approach seeks only to describe a limited number

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**Table 1. Interpretations of the dominant paradigm**

<table>
<thead>
<tr>
<th>Interpretation:</th>
<th>Taxonomic</th>
<th>Empiricist</th>
<th>Nominalist</th>
<th>Dimensional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hierarchically ordered descriptions?</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Homogeneity of class members</td>
<td>Identical</td>
<td>Approximate</td>
<td>Variable</td>
<td>n/a</td>
</tr>
<tr>
<td>Mutually exclusive classification?</td>
<td>Yes</td>
<td>Approximate</td>
<td>Approximate</td>
<td>No</td>
</tr>
<tr>
<td>Mixed designs?</td>
<td>Very few</td>
<td>Yes</td>
<td>Very few</td>
<td>Yes</td>
</tr>
<tr>
<td>Collectively exhaustive?</td>
<td>Yes</td>
<td>Large proportion</td>
<td>No</td>
<td>Large proportion</td>
</tr>
</tbody>
</table>

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of ideal types based on a few aspects of competitive-strategy design, selected for their importance to the paradigm's theory of performance.

The nominalist approach is hierarchical in that the limited number of characteristics chosen to describe ideal types are held to be fundamentally important to the design and performance of competitive strategies, and to be the basis on which to distinguish more richly described designs (Bakke, 1959; Rich, 1992; Porter, 1980: 40–41). All differentiation designs share the characteristic of pursuing a price premium; cost designs are oriented to economy as the path to profit. This essentialist distinction between ideal types is common to both the nominalist and taxonomic interpretations and means that both expect the number of mixed designs to be small (Doty and Glick, 1994).

The nominalist interpretation of the dominant paradigm is accordingly formalized as follows:

Proposition 1c: Competitive-strategy designs can be likened to a greater or lesser extent to one of two fundamentally different archetypes: one emphasizing advantage from costs, the other from differentiation, each with broad and focused market scope variants. Only a very small number of mixed-emphasis designs will exist.

Generics interpreted as dimensions of competitive-strategy design

The fourth approach interprets the characteristics of market scope, cost-, and differentiation-emphasis as independent dimensions of a multivariate space encompassing most of the variation in competitive-strategy designs (Karnani, 1984; Miller and Dess, 1993). Distinctive features of this interpretation are summarized in Table 1.

Unlike all other interpretations of the dominant paradigm, the dimensional approach does not define classes of competitive-strategy designs, so that the question of class homogeneity does not arise. Rather, the approach is restricted to describing the space in which classes may be defined. The distinction is essentially that drawn between two of Pepper's 'world hypotheses': formism, which describes the world in categories; and mechanism, which describes the world in elements and the relationships between them (Pepper, 1942).

Because all designs are positioned relative to both cost- and differentiation-dimensions, the presence of one emphasis does not exclude the other, and unrestricted scope is allowed to mixed-emphasis designs (Miller and Dess, 1993; Parker and Helms, 1992). Even the extreme archetypal designs of cost- and differentiation-emphasis cannot be adequately described in their own terms alone, but must be positioned relative to both parameters: cost leaders must not lose touch with the competitive standards of differentiation, and vice versa. The descriptive parameters are expected to be independent of each other and without hierarchical rank.

This fourth interpretation of the paradigm's descriptive system can be stated as follows:

Proposition 1d: Most competitive-strategy designs can be meaningfully positioned in the three-dimensional space described by (i) relative emphasis on cost advantage; (ii) relative emphasis on differentiation advantage; and (iii) the market scope adopted.

The paradigm's theory of performance

The fundamental theorem of the dominant paradigm is that above-average performance can only be achieved by adopting one of the four generic designs. Performance is defined as above-average rate of return (Porter, 1980: 35), sustained over a period of years (Porter, 1985: 11). This theorem is formalized in different ways, depending on the interpretation of the paradigm's descriptive system. The dimensional interpretation is primarily concerned with defining the space in which competitive strategy designs may be described. To support the paradigm's theoretical propositions, some classification of designs within this space is required, using one of the other approaches.

Taxonomic and empiricist approaches that attempt a comprehensive classification of all designs specify those classes with high-performance attributes:

Proposition 2a: Classes of competitive-strategy design will show above-average performance that are characterized by a distinctive emphasis, relative to competitors, on one of cost advantage, or differentiation advantage; and are either broad or focused in
market scope. Only a small number of mixed-emphasis designs will show above-average performance. The class of designs that fail to achieve distinctive emphasis relative to competitors will record average or below-average performance.

The nominalist approach does not attempt comprehensive classification, but rather posits a small number of ideal types. Performance will improve as actual designs approximate these ideals:

Proposition 2b: The incidence of above-average performance will increase as competitive-strategy designs approach one of two fundamentally different archetypes: one emphasizing advantage from costs, the other from differentiation, each with broad and focused market-scope variants. Only a small number of mixed-emphasis designs will show above-average performance. As designs depart from these ideals and fail to achieve distinctive emphasis relative to competitors, they will record average or below-average performance.

As discussed above, measuring the distance between actual and ideal involves not only identifying distinctive emphasis in terms of one ideal, but also measuring proximity to competitors’ standard in the other.

Both versions of the theory stem, as we have seen, from interpretations that emphasize the essentialist differences between strategies designed to support cost advantage and differentiation advantage. Failure to choose between them is theorized to violate their distinctive requirements and to lead, in turn, to lower performance.

In a similar way, failure to choose either a strategy adapted to a broad market scope, spanning many segments, or one that focuses on one or a few segments, is theorized to produce lower performance. An important aspect of this choice is that it defines the scope of competitors against which the firm seeks to be distinctive. Failure to define competitive scope results in poorly targeted designs and middling performance. The paradigm’s theory of performance is thus U-shaped with respect to market scope, positing higher performance when designs are well adapted to either broad or focused target markets, and average or below-average performance for intermediate designs. The authors of the PIMS study pointed out that this U-shaped relationship with respect to market scope was not necessarily inconsistent with their clear result that performance improves with market share, because PIMS defines share relative to the firm’s ‘served market,’ and this can be either broad or focused in Porter’s terms (Buzzell and Gale, 1987: 85–86). For both Porter and PIMS, successful competitive strategies are likely to produce strong market share in the served market.

STUDY ONE: META-DIMENSIONS OF COMPETITIVE STRATEGY

This section describes the meta-analytic method developed for this study, and applies it to summarizing the dimensions of competitive strategy, as described in the empirical record.

Meta-analysis method

Meta-analysis is the term used to describe a structured, quantified analysis of a body of empirical literature on a theorized relationship. Relative to literatures in applied psychology and organization behavior from which meta-analysis emerged, use of these techniques has been slow to spread to management disciplines. Marketing has been an early adopter (Farley, Lehmann, and Sawyer, 1995), and there are a handful of meta-analyses on relationships of interest to strategic management, i.e., the effect of formal planning on performance (Schwenk and Shrade, 1993); the association between industry concentration and performance (Datta and Narayanan, 1989); the effect of mergers and acquisitions on shareholder wealth (Datta, Pinches, and Narayanan, 1992); and the influence of a number of proposed drivers on innovation (Damanpour, 1991).

Methods of meta-analysis

Several meta-analytic methodologies have been developed (see Raju, Pappas, and Williams, 1989, and Hunter and Schmidt, 1990: 468–489, for introductions to the main methods). A distinction can be drawn between those methods that seek to produce a consistent aggregation of the empirical evidence on a relationship, and those which further seek to draw inferences from these aggregations on the size and variance of relationship
effects in a population. Among the most widely used methods, the meta-analysis introduced by Glass and colleagues (Glass, McGaw, and Smith, 1981) is of the first, descriptive, type (Hunter and Schmidt, 1990: 479); and that developed by Schmidt and Hunter (Hunter and Schmidt, 1990) is of the inferential type.

Inferential meta-analyses have become a powerful tool for reducing estimated variance in a parameter (Hunter and Schmidt, 1990: 485) and hence uncovering nonzero effect sizes which had formerly been hidden by type II errors in individual studies (Schmidt, 1992). However, the benefits of inferential meta-analysis are gained at the cost of stringent requirements for the consistency of data (see Hunter and Schmidt, 1990: 480–481), several of which are not met in the empirical literature on generic competitive strategy. First, it must be possible to interpret each study as a random sample from a population. Where one study reports more than one analysis on the same data (as in Hambrick, 1983; Galbraith and Schendel, 1983; and Douglas and Rhee, 1989), use of both analyses violates the independence assumption. Second, the studies must use the same variables in their specification of the relationship. Violation of this requirement is empirically important: failure to use identical model specification across studies has been found to represent the largest source of effect-size variance in meta-analyses in marketing (Farley et al., 1995). Third, where regression coefficients (or factor coefficients) are to be used, cumulation into a meta-analysis requires that these be measured using exactly the same scales (Hunter and Schmidt, 1990: 203–204).

Noncomparability of scales and model specification across studies is an inevitable feature of the comparative novelty of studies into competitive strategy, and its research designs. As shown above, Porter’s paradigm of generic competitive strategy has been cast in a number of different interpretations, and researchers have had good reason to expand the list of elements of competitive strategy they wish to include in their analysis, and have often devised their own scales for these constructs.

Furthermore, the polythetic nature of the concept of generic competitive strategy suggests research designs involving principal component analysis and cluster analysis. As with regression coefficients, scale noncomparability across studies makes the use of factor coefficients in a Schmidt–Hunter type meta-analysis problematic. More fundamentally, what is of interest in a meta-analysis of this literature is the cumulation of multivariate patterns of association between many elements of competitive strategy, and not one single effect size in a relationship. There are no established meta-analytic tools of the inferential type to deal with this situation.

A descriptive meta-analytic procedure for factor and cluster analysis

Although the barriers to an inferential meta-analysis appear insuperable at present, the methods developed for this study permit a descriptive meta-analysis of the empirical literature on competitive strategy. By constructing a consistent aggregation of the patterns of competitive strategy design, the full weight of the empirical record can be applied to assess the validity of the paradigm’s descriptive and theoretical propositions. Hence a descriptive meta-analysis is sufficient for the purpose of establishing a dialogue between the dominant paradigm and the empirical record, and the further development of the paradigm. Also, the research questions posed by the paradigm attach greater importance to the existence or otherwise of multivariate patterns than to the degree of closeness in those patterns. The additional precision in estimation of effect sizes, which is an important advantage of inferential meta-analyses, is of secondary importance here.

The first step in building the required meta-analysis is to produce consistent aggregates of the principal component solutions that are used to summarize and describe competitive strategy. Studies use principal component factor analysis to represent many elements of competitive strategy with a smaller number of factors, each of which represents an orthogonally independent dimension of competitive-strategy design (Kim and Mueller, 1978). The estimated factor coefficients also identify those elements which are most closely associated with each dimension.

The primary aim of a meta-analysis over several such studies should be to identify dimensions which best describe the totality of orthogonal factor solutions in the empirical literature. It is natural to refer to these as meta-dimensions of competitive strategy. The procedure assumes the
presence of an unknown number of these orthogonal dimensions in the population of all competitive strategy designs. Each study’s factor solution is taken as a sample estimate of these population dimensions, and each study’s estimate of the elements most closely associated with each factor is taken as a sample estimate of the elements most closely associated with a meta-dimension.

Because of the above-noted variability in constructs and measures, cumulation of factor scores across studies is not meaningful. What amounts to a voting procedure is used instead. Each vector of factor coefficients reported in a study is transformed to a vector of ‘votes’; elements which show significant nonzero coefficients on the factor are coded 1; others coded 0. Each vote vector is taken as a sample record that identifies those elements that are significantly associated with a meta-dimension of competitive strategy. Cluster analysis is then used to aggregate these multielement vote vectors across studies into commonly occurring patterns. Each cluster of similar vote patterns, indicating which elements of competitive strategy are most often associated together with an orthogonal factor, are taken as the best aggregate description of a meta-dimension that can be derived from the empirical literature. Taken together, the set of clusters describe the number of orthogonal meta-dimensions of competitive strategy that have been isolated.

Finally, the incidence of ‘votes’ for each element clustered together in a meta-dimension is compared to its overall frequency, using as a metric the standard test statistic for differences in proportions. As is well known, the use of cluster analysis to create categories violates the assumptions required to use these statistics to draw inferences from the sample of studies to a population. As discussed below, other methods must be used to assess the validity of the cluster solution (Ketchen and Shook, 1996). The statistic is used here for the simpler purpose of focusing the description of each meta-dimension on those elements of competitive strategy that are most distinctive of that dimension in the available empirical record.

The method follows the same logic, in a multivariate context, as the statistically correct bivariate procedure of vote counting, in which the proportion of studies with significant effect sizes is compared to that expected under a null hypoth-

esis of no relationship between the variable (Hunter and Schmidt, 1990: 473). As Hunter and Schmidt note, a majority of nonzero effects typically not needed to reject the null hypothesis and it is the use of the majority criterion that is responsible for the errors associated with vote counting as a meta-analytic procedure. The focus of vote counting on the existence, rather than the effect size, of relationships is a recognized limitation of the method in univariate meta analyses, but is appropriate for the purpose of isolating patterns of relationships, as in this case between elements of competitive strategy.

One step in this procedure prohibits its use as an inferential meta-analysis, that is, the use of cluster analysis to aggregate vote vectors, and the consequent violation of the assumptions requires to draw inferences to the population of all competitive strategies. Instead, the procedure produces a descriptive aggregation of the accumulated evidence on the independent dimensions of competitive strategy, as they have emerged in the empirical record to date. More universal claims must await more powerful procedures.

When assembling multiple studies into a meta-analysis, the question arises whether or not to weight each study by sample size. Monte Carlo simulations suggest that large samples are to be preferred for their lower exposure to artifacts due to variation (Koslowsky and Sagie, 1994). On the other hand, when a meta-analysis includes studies that follow a skewed distribution of sample sizes, with outliers of very large or small samples. Osburn and Callender (1992) recommend the use of unweighted results, and conclude that there is little to be gained from sample-size weighting in most meta-analyses. The empirical literature on competitive strategy is highly skewed towards sample sizes of less than 100, with a long tail reaching out to n = 2578 (see Table 2). Accordingly, this meta-analysis uses vote vectors unweighted for sample size.

Methods of clustering appropriate to this meta-analysis

Use of cluster analysis in strategic management research has been critically reviewed by Ketchen and Shook (1996). They conclude that the design of these analyses must be careful to match the analysis to the type of data involved, and to assess the reliability of results by ‘triangulating’ the results.
of several distinct clustering methodologies together. Following their advice, the distinctive demands placed on cluster analysis within the present meta-analytic methodology are now examined.

Since vote vectors involve binary data, the more familiar measures of similarity such as Euclidian and Mahalanobis distances are inappropriate. Of the binary measures of similarity, the Jaccard coefficient was selected because it contains only common occurrences of a pair and ignores common absences (Aldenderfer and Blashfield, 1984: 29). This is appropriate to the data because not all studies of competitive strategy include all elements, so that the absence of an element can be due to differences in study design rather than strategic behavior.

The ultimate choice of clustering algorithm should be guided by the clusters' shape in the \( n \)-dimensional space used to describe the data, and variation in cluster sizes (Aldenderfer and Blashfield, 1984: 59–62). It is therefore advisable to explore several methods as a means of enlightening the structure of the data (Aldenderfer and Blashfield, 1984: 45; Miller, 1981; Ketchen and Shook, 1996).

Judgments on the shape of clusters and choice of algorithm should also be guided by theory. The algorithm most often applied in the empirical literature on generic competitive strategy is hierarchical agglomeration, using Ward's method to link successive cases to the closest cluster. It is known that this algorithm produces, and is most appropriate to, clusters which are of approximately equal size and are uniformly spread over the various dimensions of analysis as hyperspheres. Such shapes cannot be ruled out \textit{ex ante}, and hierarchical agglomeration is used as one approach to representing the data of this study.

However, this algorithm is inconsistent with the dominant paradigm's assertion that each design must emphasize a subset of strategies in which it will seek a distinctive advantage. Designs consistent with this assertion will form ellipsoids aligned to those dimensions of competitive strategy that are emphasized within the cluster. Attempts to represent such data using hierarchical agglomeration have led to some famous failures of cluster analysis in fields such as astronomy (Wishart, 1969). Also, there is no reason to expect designs to be equally popular, or clusters to be of equal size. There are thus reasons to prefer the density analysis algorithm (Wishart, 1969, 1987: 64), which is better suited to the identification of ellipsoidal clusters, and which also protects small, dimensionally focused, clusters from being merged with larger neighboring hyperspheres.

The study accordingly applied both these algorithms to the data, together with an iterative relocation algorithm which optimizes within-cluster similarities and between-cluster dissimilarities. Like hierarchical agglomeration, iterative relocation is most suited to representing clusters that form hyperspheres (Aldenderfer and Blashfield, 1989: 48). The CLUSTAN procedures HIERARCHY, DENSITY, and RELOCATION were used (Wishart, 1987). Hierarchical agglomeration used the average linking rule in place of the more familiar Ward's method on the grounds that it best preserves the structure of the data space (Aldenderfer and Blashfield, 1984: 45; Milligan, 1980). Density analysis estimated the density surrounding each case as the average of distances to its seven nearest neighbors, as recommended by Wishart (1987: 66) for this size of data set.

Data

This section discusses the measures of strategy used in the empirical record, assessing their comparability, and their ability to support the meta-analysis.

Selection of studies

A search of the ABI-Inform data base was conducted in late 1995, yielding 126 entries for 'competitive strategy' and 84 for 'generic strategy.' From these records, and subsequent references, 17 studies were identified that described competitive-strategy designs using principal component factor analysis and cluster analysis. With two exceptions (Miller and Friesen, 1986; Wright \textit{et al.}, 1991), elements of competitive strategy are first aggregated into a smaller number \( n \) of dimensions of strategic design using principal component factor analysis. Thirteen of the studies use cluster analysis to isolate common designs within that \( n \)-dimensional space. Ten studies also examined the performance of designs. Table 2 identifies which study applied each analysis.

It has been found that the selection of studies is the most important source of difference.
between pairs of meta-analysis (Wans, Sullivan, and Malinak, 1989). Here, both computer-assisted and manual methods were used to identify relevant studies, so that the only restriction was that a study be published before or during 1995. Three limitations for the meta-analysis follow. First, the analysis is open to any publication bias in favor of positive associations between elements of competitive strategy.

Second, the configurations of competitive strategy that emerge will be descriptive only of the kind of firms that have been studied to date. It can be seen from Table 2 that certain types of firm are likely to be overrepresented in the