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MEASURING STRATEGY COHERENCE THROUGH PATTERNS OF STRATEGIC CHOICES

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Strategies at different levels need to be coherent to ensure competitive advantage (Hofer and Schendel, 1978). Strategy coherence is the consistency of strategic choices across business and functional levels of strategy. In this paper we focus on strategy coherence. Using patterns of strategy, we develop a measure of the extent of strategy coherence. The relationship between coherence and performance is used to validate the measure. We illustrate the application of the measurement and validation process, in the context of acute care hospitals. The results indicate that our measure of coherence is monotonically related to performance. We also find performance differences between more and less coherent hospitals on the industry specific performance indicator of occupancy. Implications for theory and practice are highlighted.

INTRODUCTION

In an overview of research issues involving business level strategy, Hambrick (1980) identified a category of research aimed at exploring inter-level strategic linkages. This followed from Hofer and Schendel's (1978) distinction between corporate, business and functional strategies and the call for research aimed at examining the relationships among strategic levels (for example, what types of corporate–business–functional strategic alignments are effective, how they are achieved and so on). Several subsequent studies using the Miles and Snow typology (e.g., Hambrick, 1983; McDaniel and Kolari, 1987) have shown that different business strategies generally have different functional profiles, and that future research should examine how strategic and functional attributes align to give different types of performance. For additional progress in this

stream of research, a measure of inter-level strategic fit or consistency (i.e., coherence) is needed.

The purpose of our study is to propose a measure of coherence between a firm's business strategy and its functional area decisions, using patterns of strategy, and examine its validity in the context of a particular industry—acute care hospitals.

The paper is divided into two key sections. The first section delimits the domain of the coherence construct. Next we discuss the measurement process and the rationale behind it. The second section describes the application of the construct in the acute care hospital market. First we present the details of the research methodology, including the research design, data collection and analysis methods used. This is followed by the measurement and analysis of coherence, amongst acute care hospitals, and a discussion of the convergent validity of the measure. The paper concludes with a discussion and implications for future research.

DOMAIN OF THE COHERENCE CONSTRUCT

Strategic management and organizational theory perspectives on fit

The concept of fit is strongly influenced by the population ecology school of thought. It has emerged as one of the foremost concepts in strategic management and organizational theory research, especially in the context of contingency theories linking context, structure and performance (Drazin and Van de Ven, 1985). Drazin and Van de Ven (1985) identify three conceptual approaches to fit. The *selection* approach assumes that fit underlies the congruence between context and structure. The *interaction* approach focuses on understanding and explaining the variations in organizational performance as a result of the interaction between context and structure. Finally there is the *systems* approach to fit, which looks at the various contingencies and patterns of interdependencies present in organizations holistically.

Venkatraman and Camillus (1984) identify key perspectives of fit based on whether the elements to be aligned are: (a) internal to the firm, i.e. the fit between strategy and organizational structure where the focus is on the implementation of strategy; (2) external to the firm, i.e., the fit between the firm's strategy and its environment where the nucleus is strategy formulation or (3) an integrated combination wherein the formulation and implementation of strategy are considered to be interactive elements. These perspectives all center on the *content* of strategy formulation.

Another group of perspectives centre on the *patterns* of strategy formulation. One argues that there are networks or alliances that compete for resources and fit is achieved when there is a favorable match between such interdependent groups (e.g., Aldrich, 1979; Pfeffer and Salancik, 1978). The other maintains that strategy is the pattern of structuring the organization and its environment, with the focus on interdependence not causation (e.g., Thorelli, 1977; Hrebiniak, 1981).

Internal consistency perspective

There is a perspective on fit that is implicit rather than explicit in its definition. This concep-

tualization views business strategy as the '. .integrated actions in the pursuit of competitive advantage' with functional strategies as the supportive activities essential for translating the core strategy into an effective guide for action (Day, 1984). To be effective, each functional strategy must support the competitive advantage sought, through a specific and consistent pattern of decisions (Hayes and Wheelwright, 1984). In other words, there is an implied underlying fit or consistency between a firm's strategies at the business and functional levels. Our study focuses on this latter perspective (i.e., the consistency of business and functional levels of strategy). This consistency of strategic choices across business and functional levels of strategy is termed coherence. While the other perspectives are also important, our objective is to propose a measure of internal consistency or coherence.

PROPOSED METHOD TO MEASURE COHERENCE

Ideally in a single industry context, coherence would be measured by examining a firm's overall business strategy and relating it to the different functional area decisions. For example, if $\{B_1\}$ represents the business strategy for firm 1, and $\{F_1\}$ and $\{M_1\}$ represent the finance and marketing strategies respectively, the critical question that we need to address is whether this firm's finance and marketing strategies are internally consistent or coherent with its business strategy. If there was a comprehensive theory that exclusively and exhaustively specified all the coherent $(\{B_i\}, \{F_i\}, \{M_i\})$ sets, the answer might have been direct. Alternatively, an in-depth knowledge of the industry, its environment, individual firms and their strategies might lead to an assessment of the coherence of each firm's strategies. However, this method is likely to suffer from a lack of inter-judge reliability and may not be replicable. Also, using such an elaborate method to measure coherence is likely to be infeasible on a large scale and in an extended and integrated study of various types of fit.

It is necessary then, to develop a measure of coherence that is not subject to the above constraints. We present a standardized model that considers industry specific variables and the

relative nature of strategy within an industry, to measure the internal consistency or coherence of strategy (see Figure 1).

This model develops patterns of business strategy within a single industry and examines the functional area decisions followed by firms pursuing the *same* business strategy to see if patterns of functional strategies can be detected. Thus, 'patterns' of business and functional strategy within a single industry are developed. These are similar in spirit to the different cross-industry classification schemas, except they consider the specific characteristics of the industry under study.[1]

Coherence of strategy is assessed by determining the dominant functional decision patterns pursued by firms following the same/similar business strategy. If two firms are following the same overall business strategy, we would expect their functional area decisions to be similar. For example, firms following a new product development strategy are more likely to have high R&D and marketing investment than firms following a strategy of growth by acquisition, which in turn might be characterized by increased capital investment, higher levels of debt, higher costs of capital and so on. The 'market' or

STEP 1: DEFINING THE INDUSTRY/MARKET
(Choice of industry/membership)

STEP 2: OPERATIONALIZING STRATEGY
(Choice of strategic variables to represent business and functional strategy for the industry)

STEP 3: DATA COLLECTION

STEP 4: DEFINING THE STRATEGIC SPACE
(Factor analysis of strategic variables)

STEP 5: DEVELOPING STRATEGIC TYPES
(Cluster analysis to develop patterns of strategy and cluster validation)

STEP 6: ASSESSING COHERENCE
(Comparing patterns of strategy across business and functional levels)

STEP 7: VALIDATING THE COHERENCE MEASURE

Figure 1. The measurement process for coherence

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[1] This process of identifying strategy patterns is similar to the methodology used to define strategic groups by Fiegenbaum and Thomas (1990) in the insurance industry, and Cool and Schendel (1987) in the pharmaceutical industry.

industry has an underlying understanding of coherence which is reflected in the patterns of resource allocations corresponding to the different business strategies pursued by firms within the industry.

However, firms that do not pursue *business* strategies conforming to the industry norm are not necessarily incoherent. Consider firms pursuing niche strategies. They may not be the dominant strategic type in the industry. However, it is expected that all niche players will have small, defensible markets, and specialized product/service offerings (as opposed to broader, generalized firms). The similarity of functional area decisions of all the niche players would determine the coherence. To quote Shortell (1985), '. .a hospital starting a new ambulatory surgery center (new service development) may find it necessary to market not only to physicians but also to consumers and employer groups; to adopt strict payment policies upon admission for those without adequate insurance coverage; and to offer productivity incentives to physicians utilizing the center. These strategies would appear to reinforce each other in the pursuit of the goal of maximizing the utilization and profitability of the new center'. If there were a group of hospitals all of which were developing this new service offering, they should have very similar strategies at the functional level as well.

Further, in the Miles and Snow (1978) typology, it was hypothesized that the three types (i.e., Defender, Prospector and Analyzer) would differ in their functional tendencies across types but that within each type, firms might follow fairly similar functional strategies. Hambrick (1983) and Shortell and Zajac (1990) did find support for the hypothesis that the three strategic types differ in their funtional tendencies. McDaniel and Kolari (1987) specifically examined the differences in marketing strategies followed by Prospectors, Analyzers and Defenders. They found that the relative emphasis on each marketing element varied across the three strategic types, with defenders being fairly consistent in a relative lack of marketing compared to Prospectors and Analyzers. In fact, they encourage marketing strategists to evaluate the consistency between the strategic type (i.e., Prospector, Analyzer and Defender) and the environment, as well as the consistency between the strategic type and marketing strategy elements employed.

Thus, to expect similar strategic types to follow similar functional policies, is well grounded in strategic management thinking. In our study, we extend the argument presented by McDaniel and Kolari (1987) to include the other functional areas of finance, human resources and operations/production.

Unstructured interviews with financial analysts and management consultants on the understanding of coherence further supported this notion. While they subscribed theoretically to the notion of strategy coherence, the working definition was more of a consistency of strategy over time and across levels, and depended on the industry/group norms.

Operationalizing the measure of coherence

Coherence is assessed by comparing the patterns of functional area decisions pursued by firms following the same business strategy. To compare the composition of firms following similar strategic patterns the following procedure is used. First, we determine the patterns of business, marketing, finance, human resources and productions strategies pursued in this industry. For each pattern of business strategy, the dominant marketing, finance, human resource and production patterns are identified. Firms *within* each pattern of business strategy, that pursue these functional patterns are then following a coherent strategy.

To determine the dominant patterns for each functional area within each of the business strategy patterns determined, consider the following. Assume $\{B_i\}$ represents the different business strategy types and $\{F_i\}$, $\{M_i\}$, $\{P_i\}$, and $\{H_i\}$ represent the finance, marketing, production and human resources strategies respectively for the *i*th firm in this market. Clearly, all combinations of ($\{B_i\}$, $\{F_i\}$, $\{M_i\}$, $\{P_i\}$, $\{H_i\}$) are not coherent. In an industry, consider *n* firms with similar business strategies $\{B_k\}$. If all *n* have similar finance strategies $\{F_k\}$, and $n-1$ firms have a similar marketing strategy $\{M_k\}$, but the *n*th firm has a marketing strategy $\{M_t\}$, then industry wisdom would suggest that the $n-1$ firms with similar finance and marketing are following strategies coherent with their business strategy. However, the *n*th firm's strategy is partially coherent because its financial strategy is coherent with the business strategy. It is important for

any measure of coherence to reflect such varying degrees of coherence.

It is possible that of the *n* firms with business strategy $\{B_k\}$, $n/2$ have similar finance and marketing strategies $\{F_j\}$ and $\{M_j\}$, while the other $n/2$ firms are similar in their finance and marketing strategies $\{F_r\}$ and $\{M_r\}$ respectively. In this case, there are two sets of functional strategies that are consistent with this business strategy, and the measure of coherence should consider that.

It could be argued a firm that does not pursue a functional strategy dominant for its business strategy type, is the one with the coherent strategy, while the others are partially coherent or not coherent at all. This might be the case, if the firm has developed an innovation that allows it to deviate from the norm established by the other firms with similar business strategies. It is thus imperative that the coherence measure be validated to ensure that a firm's strategy is not labelled coherent or incoherent in error. In general, multiple dominant functional groups are possible. Groups with more than n/k members are labelled dominant (where n = number of firms in the industry and k = number of different strategy patterns followed by these *n* firms). Such instances are expected to be rare and likely to occur when the clustering process is stopped prematurely.

Validating the measure of coherence

The key issues involved in validating a construct are whether it measures what it is supposed to and whether it adequately captures the unobservable phenomena being measured (Parasuraman, Zeithaml, and Berry, 1988). The answers to these questions are qualitative rather than quantitative in nature. Following the procedure used to validate SERVQUAL (the popular measure of service quality proposed by Parasuraman *et al.* 1988), we examine the content and convergent validity of the coherence measure.

The first step in the validation process is content validity. The industry analysis should provide a strong basis for the market definition as well as the variables used to define business and functional strategy. Sound industry analysis will provide the content validity of the measure.

The underlying items of our coherence measure are the strategic variables for the industry. The

coherence measure proposed here is a measure of the internal consistency across these variables. Providing the strategic variables are drawn from a strong industry analysis, the measure will inherently demonstrate content validity. In the example described, an elaborate and comprehensive industry analysis provides the basis for the choice of the strategic variables.

The next step is to examine the convergent validity of the measure. Theory postulates that higher performing firms have strategies that are more internally consistent or coherent. Shortell, Morrison, and Robbins (1985) state'. . .it is important to note that marketing, financial and human resource functions and strategies are interdependent and, indeed, in higher performing health care organizations, one would expect to find these functional strategies to be consistent with each other in support of a given corporate or business strategy.' Pettigrew (1989) identifies the need for coherence of belief and purposes as well as coherence that is interorganizational, for a strategy to survive. This concept reflects the organization's ability to manage interrelated emergent changes. This view is echoed by Whipp, Rosenfeld, and Pettigrew (1989) who suggest that coherence between strategic and operational issues, is a fundamental attribute visible in more successful firms.

The managerial perspective on the coherence–performance relationship seems to reflect the views found in the literature. The 'planning mode' assumes that following a coherent strategy reinforces the company's competitive strengths, which in turn should be reflected in improved performance. If a firm has high performance, it must be pursuing a coherent strategy. A valid measure of coherence should then be monotonically related to performance. It is important to recognize that the appropriate performance measures may vary from one industry to another, for example for-profit versus not-for-profit industries.

ILLUSTRATION: MEASURING STRATEGY COHERENCE AMONG ACUTE CARE HOSPITALS

Step 1: Industry description

The industry chosen for this study is acute care hospitals in a major MSA during 1986–87.

Among health care providers, competition is largely localized. In large metropolitan areas, the competitive market for hospitals is confined to the geographic area defined by the MSA (Noether, 1987; Pegels and Sekar, 1989). Hospitals within the same MSA compete for patients, doctors and other resources. This is primarily because potential patients, doctors and hospital administrators are more likely to be concerned with 'reasonable commuting distances' than with city or county boundaries (Chiswick, 1976). The hospitals form a sort of local community offering the same general medical care to the local population (Fennell, 1980). Due to confidentiality requirements, neither the city nor the individual hospitals can be identified.

Step 2: Operational definition of business and functional strategy

Business strategy addresses the question of how the firm should compete in the businesses it has selected (Hambrick, 1980). The scope or mission of strategy reflects the extent of the organization's planned and present interactions with its environment (Hofer and Schendel, 1978). In the context of hospitals, it is important to define the strategic business unit, as conceivably the different services offered by the hospital could be considered separate lines of business. However, these different services share resources (labor, capital and drugs, etc), customers (physicians and patients), and distribution (a single tertiary care center). Based on these criteria, the entire hospital could be considered a single business unit—in the business of providing 'wellness' or health care (Hofer and Schendel, 1978).

Description of variables used to define business strategy

The key variables used to capture business strategy were: bed size; range of services; the case mix index; the cost of medical education, the proportion of Medicare and Medicaid patients and the geographical location. These variables (as well as those used to define functional strategy) were identified based on an extensive study of the literture, as well as in-depth discussions with industry experts.

Hospitals are multiproduct firms and produce varying quantities of education, research, out-

patient care and community services, in addition to the primary output of inpatient care (Scott and Flood, 1985; Flood and Scott, 1987). The size of the hospital and the range of services provided influence the hospital's output and attractiveness to physicians and patients. Size could provide the hospital with economies of scale (Nyman and Bricker, 1989), and the range of services provides the potential for economies of scope (Cowing and Holtman, 1983).

The number of beds was used to reflect the potential for economies of scale in hospital care, with larger hospitals having greater potential for increased output and therefore lower average costs and higher margins or cost price ratios (Alexander and Lewis, 1984; Becker and Sloan, 1985; Farley, 1985).

A hospital is a collection of services, with considerable variation in the range of services a hospital has to offer. Patient preferences between different hospitals are influenced in part by the availability of various services and amenities (Alexander and Lewis, 1984; Becker and Sloan, 1985). The service index was captured as a ratio of the number of services offered by the hospital relative to the total number of services available in the competititve market (as listed in the AHA Annual Survey databook).

Probably the largest segment of a hospital's market comes from an area of proximity to the hospital. The physical location becomes a proxy for convenience, travel time and can be a source of competitive advantage (Robinson and Luft, 1985). In fact, the closer two hospitals are geographically, the greater the overlap between their patient and physician base. To capture this, the actual location relative to a central point in the SMSA was used.

An important aspect of business strategy is the case mix a hospital treats. This varies across hospitals and over time. The case mix of a hospital has a major role to play in monitoring the quality of care, the cost implications and in third party payors reimbursing the hospital (Hornbrook, 1982).[2]

The hospital's involvement in teaching/medical education is another determinant of business strategy. The distinction is made for teaching hospitals because they may incur a higher cost due to the teaching component (Sloan, Feldman, and Steinwald, 1983; Noether, 1987; Alexander and Lewis, 1984). Teaching hospitals treat a more complex case mix, and are staffed and equipped more extensively to deal with the wider and more complex range of cases (Flood and Scott, 1987). The actual cost of providing medical education is used to reflect this dimension.

The costs of hospitals have been shown to be affected by the proportion of Medicare and Medicaid patients (Sloan *et al.*, 1983). This factor also impacts the service intensity of hospitals participating in the Medicare and Medicaid programs (Scott and Flood,1985). The proportion of Medicare and Medicaid discharges relative to total discharges were used to measure these dimensions of the hospitals business strategy.

Operational definition of functional area decisions

Functional area decisions determine the bases upon which the organization will support the corporate and business level strategies (Hayes and Wheelwright, 1984). At the functional decision level, the critical components described by Hofer and Schendel (1978) are the level and pattern of the organization's past and present resource and skill deployments that help achieve its goals and objectives. Thus, functional area decisions were operationalized in terms of the resource deployment patterns along key functional areas. Shortell *et al.* (1985) identify finance, marketing and human resources as primary functional area strategies for health care providers. In addition, the operations or production element is also critical.[3]

Description of variables used to define functional area decisions

A hospital's *marketing* decisions reflect among others, elements such as the relative emphasis of promotion towards physician, patient and employer groups; the ease of access and con-

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[2] The case mix index is a composite of the hospital's proportion of patients seen in each diagnostic category (DRG), the average length of stay and the average costs of treatment for each diagnostic category. See Hornbrook (1982) for a detailed discussion.

[3] As a part of the industry analysis, the appropriate categories reflecting the organizational structure of the firms in the industry must be identified.

venience of various product/services and so on (Shortell, *et al.*, 1985). While the eventual recipient of health care is the patient, physicians play an important gatekeeping role. To capture the relative emphasis on physicians and patients in the community, the hospital's public relations and communications efforts towards these two target groups were used. To keep up with the industry's cost containment efforts, hospitals are offering cost effective alternatives to inpatient care such as HMOs (Health Maintenance Organizations) and PPOs (Preferred Provider Organizations). Some hospitals have salespersons who market PPO programs to businesses and/or co-ordinate with third party payors in setting up HMO programs. In response to the unbundling of services, hospitals have set up free standing satellite or outreach centers. These act as primary care centers, and are a drawing force for tertiary care. They may be in the form of doctors' offices, or centers for ambulatory surgery and care and help increase the target market and the market share potential of the hospital.

A hospital's *financial* decisions include the relative use of debt versus equity in financing capital investments, the degree to which investment decisions balance short run and long run objective, and the decision to be a low cost provider (Shortell *et al.*, 1985). Measures of indebtedness and financial leverage include the debt asset ratio which looks at the proportion of external funding; and the long term debt ratio which looks at the financing of fixed assets through long term versus short term debt. The asset to bed ratio represents the capital structure of the hospital (Renn *et al.*, 1985), while the net asset ratio measures the capital commitment of the hospital (Robinson and Luft, 1985; Farley, 1985). The cost of capital ratio measures the cost to the hospital of its capital requirement (Renn *et al.* 1985; Alexander and Lewis, 1984). A lower cost of capital indicates relatively low debt financing or perhaps an older asset base. The cost–price ratio, the average daily cost ratio and the ability to markup, all capture the hospital's ability to act as a low cost provider and reflect on its potential profitability[4] (Farley, 1985; Davis, 1971; Alexander and Lewis, 1984; Renn

et al., 1985). Since hospitals treat different mixes of patients and cases, these ratios need to be adjusted for such case mix differences.

A third functional area is the *human resources* area. Human resource availability is likely to influence the productivity and market share of the individual hospital. Relevant decisions in this area include the expertise and experience of the current mix of professionals to provide the level of care and the potential substitutability of lower paid professionals for higher paid ones (Shortell *et al.*, 1985). Hospitals make themselves more attractive to patients and physicians by hiring additional staff, since it enables them to care for more patients; treat a wider variety of conditions; and provide better and higher quality service. For hospitals, staffing is a major concern—both in terms of adequacy and quality of the nursing staff, the support staff and the medical staff. The adequacy and quality of staff members reflects the structural aspect of the quality of care (Donabedian, 1985). The intensity of staffing varies across hospitals and affects the costs and performance of the hospital.

A major aspect of *production/operations strategy* is the time from admission to discharge. This is reflected by the average length of stay. Hospitals with longer average lengths of stay have higher per admission costs but lower per day costs, since the higher costs are incurred in the earlier days of the admission, and are spread over a greater number of subsequent patient days (Renn *et al.*, 1985; Alexander and Lewis, 1984). This measure has to be weighted by the case mix the hospital treats. The level of service provided is measured by the admissions/beds ratio (Renn *et al.*, 1985). The numbers of births and surgical admissions affect length of stay and occupancy. Lower rates of surgical operations may reflect some degree of specialization (Farley, 1985; Becker and Sloan, 1985; Renn *et al.*, 1985). With outpatient care still being reimbursed retrospectively, hospitals have shifted a greater proportion of care towards outpatient treatment. Outpatients augment capacity, while being less labor intensive, not increasing the total processing time and reducing treatment costs (Alexander and Lewis,

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[4] The cost–price ratio and markup ratio are inversely proportional to the hospital's capital intensity. If the need

for additional investment is high, both prices and markups tend to be higher relative to costs (Farley, 1985).

Table 1. Variable definitions: Hospital industry

Marketing variables

Physician PR index	Number of PR activities
Community PR index	Number of community activities
Existence of sales person for employer groups	Yes/No
Existence of Satellite centers	Yes/No

Finance variables

Debt/asset ratio

$$\frac{\text{Total liabilities}}{\text{Total assets}}$$

Long term debt ratio

$$\frac{\text{LT liabilities}}{\text{Fixed assets}}$$

Asset/bed ratio

$$\frac{\text{Total fixed assets}}{\text{Total beds}}$$

Cost of capital ratio

$$\frac{\text{Cost of capital}}{\text{Total expenses}}$$

Gross mark-up ratio

$$\left(\frac{\text{Total Patient revenue}}{\text{Operating expenses}}\right) \times \text{Case mix index}$$

Cost price ratio

$$\left(\frac{\text{Total expenses}}{\text{Average price}}\right) \times \text{Case mix index}$$

Adjusted cost ratio

$$\frac{\text{Operating expenses}}{\text{Inpatient days}}$$

Net asset per patient

$$\frac{\text{Net fixed asset}}{\text{Average daily census}}$$

Production variables

Average length of stay

$$\frac{\text{Inpatient days}}{\text{Number of admissions} \times \text{Case mix index}}$$

Birth index

$$\frac{\text{Number of births} \times 100}{\text{Number of admissions}}$$

Surgical index

$$\frac{\text{Inpatient surgeries} \times 100}{\text{Number of admissions}}$$

Admissions to bed ratio

$$\frac{\text{Number of admissions}}{\text{Number of beds}}$$

Outpatient to inpatient ratio

$$\frac{\text{Total outpatients visits}}{\text{Total inpatient visits}}$$

Table 1. Continued

Human resource variables	
Total staff per patient ratio	$\dfrac{\text{Full time equivalents}}{\text{Average daily census}}$
Medical staff per bed ratio	$\dfrac{\text{Total medical staff}}{\text{Number of beds}}$
Nursing staff to bed ratio	$\dfrac{\text{Total FTE RN and LPN}}{\text{Number of beds}}$
Nursing to medical staff ratio	$\dfrac{\text{Number of FTE RN and LPN}}{\text{Number of doctors on staff}}$
Medical staff to patient ratio	$\dfrac{\text{Number of medical staff members}}{\text{Average daily census}}$
Nursing staff to patient ratio	$\dfrac{\text{Number of FTE RN and LPN}}{\text{Average Daily Census}}$
Ratio of payroll expenses	$\dfrac{\text{Total payroll expenses}}{\text{Total expenses}}$
Ratio of non payroll benefits	$\dfrac{\text{Non payroll benefit expenses}}{\text{Total expenses}}$

Business strategy variables	
Bed size	Total number of beds
Location	X–Y co-ordinate on the map
Teaching involvement	Total cost of medical education
Scope of services index	$\dfrac{\text{Number of services offered by hospital}}{\text{Total number of services listed in AHA}}$
Case mix index	$\displaystyle\sum_i P_{ih} W_i$ where P_{ih} = Proportion of patients in diagnostic category i at hospital h and W_i = Medicare normalized cost weight for diagnostic category i
Medicare ratio	$\dfrac{\text{Number of Medicare discharges}}{\text{Total number of discharges}}$
Medicaid ratio	$\dfrac{\text{Number of Medicaid discharges}}{\text{Total number of discharges}}$

Performance variables	
Occupancy ratio	$\dfrac{\text{Average daily census}}{\text{Available beds}}$

1984; Renn *et al.*, 1985). The details of the variable definitions are provided in Table 1.

Step 3: Data description

The population for the study acute care general hospitals was defined by the American Hospital Association in the metropolitan MSA. Given a population of 90, a census of hospitals was considered necessary. The data sources used are both primary and secondary. To get a practitioner perspective on coherence and provide external substantiation of the results of the study, an unstructured survey of a few industry analysts and management consultants was also conducted.

Secondary data was obtained on (a) hospital operations, (b) size and service mix, (c) staffing characteristics, and (d) financial data. These were obtained from the 1986 American Hospital Association annual survey, the state regulatory agency's discharge abstracts for 1986 and the 1986 Medicare Cost Report.

To get information on marketing activities, a combination mail and telephone survey of marketing executives was conducted. The response rate was 80%, giving a study sample size of 71 hospitals.

Steps 4 and 5: Defining the strategic space and developing strategy patterns

The following procedure was used to develop the strategy patterns. First, for the finance, human resources and operations areas, and for business strategy, the relevant variables were factor analyzed using principal components analysis, to capture the correlations between variables and reduce the dimensions of the respective strategic space in the interest of parsimony.[5]

Next, to determine the different patterns of business strategy pursued in this market and of the various functional area decisions, cluster analysis was used on the strategic variables for marketing strategy and the factor scores for business, finance, human resources and operations strategy. Ward's hierarchical clustering (1963) was used. The final number of clusters was determined using the following rule adopted from Fiegenbaum and Thomas (1990).[6]

1. An additional cluster should increase the fit by less than 5% and
2. The clusters obtained explain at least 60% of the overall variance ($R^2 \geq 60\%$).[7]

Validation of clusters

Hambrick (1984) notes that the subjective choice of a cluster solution necessitates some form of validation. To eliminate the subjectivity in the choice of a cluster solution, the stopping rule described earlier was supplemented with an analysis of variance on cluster means. In all cases, the F statistic was significant at the $\alpha = 0.01$ level, confirming the tightness and separation of the clusters.[8]

In addition, discriminant analysis was carried out to validate the cluster structure. For each of the strategy cluster solutions, the discriminant function was developed on one half (randomly selected) of the observations and used to classify the other half (Hooley *et al.*, 1992; Punj and Stewart, 1983). The error rates (misclassification) for included observations ranged from 1.47% to 11% and for non-included observations ranged from 7% to 20%. The following discussion presents further validation that the clusters obtained have substantial meaning and are not a statistical artifact.

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[5] For each of these areas, three principal components were extracted using the scree plot and eigen value greater than 1 criteria. For finance these factors reflected the dimensions of cost of capital, cost of providing care and the capital structure of the hospital. In the case of human resources, the principal factors reflected the adequacy and structural quality aspect of medical and nursing staff, and the labor costs. The principal components for operations reflected primarily the case flow, length of stay and the shift to less intensive utilization. Finally, the principal components for business strategy captured the size and range of hospital activities, patient mix and location. In all cases, the principal components retained accounted for 74–84% of the total variance. Details of the factor analysis can be obtained from the authors.

[6] Following the stopping rule, five clusters were formed for business strategy, and for the operations and human resources decisions. In the case of finance and marketing, four clusters were formed.
[7] For finance, according to these rules, six clusters should have been retained. In the interest of interpretability and in order to have more than one element in a cluster, the four-cluster solution was retained. An examination of the hospitals in each cluster showed that from the six-cluster solution to the four-cluster solution, clusters 4, 5, and 6 merged to form cluster 4.
[8] Details of the analysis of variance are available from the authors.

Description of patterns of business strategy

For the business clusters, five clusters were defined. Group 1 consisted of 14 hospitals, relatively smaller in terms of bed size with no teaching involvement and a restricted range of services, most of which were basic facilities. These hospitals were characterized by a simple case mix, a low proportion of Medicare and Medicaid patients and suburban locations. These were typically small community hospitals located in the outer suburbs.

The 10 hospitals in Group 2 were large, mostly in the city and close suburbs with a wide range of services and a complex case mix index. All were involved with medical education. A high Medicare burden but low Medicaid indicates an older patient base.

Group 3 had 18 medium sized suburban hospitals not involved in medical education, and offering a very limited range of services. A high case mix index indicated complex cases. These are also mostly nonprofit hospitals with a fairly high Medicare/Medicaid burden.

Group 4 consisted of very small hospitals (there were 10 such hospitals) within the city and inner suburbs. They offered a very restrictive basic range of services, with a simple case mix, no teaching involvement, and a low Medicare burden but very high Medicaid burden (indicating a lower economic base of the population).

Group 5 comprised the six large teaching hospitals, all within the city, with a wide range of services offered and a complex case mix index—consistent with the nature of teaching hospitals. The Medicare burden was low though the Medicaid burden was high. The group means on these variables are presented in Table 2.

Step 6: Assessing coherence of strategy

To assess coherence, we first look for dominant functional strategies for each business strategy type or group. The following section discusses coherent strategies within each of the five business strategy types in this market.

Coherence in Group 1

The dominant marketing strategies pursued by firms in this cluster reflected high community involvement, but a relatively low physician marketing component. These hospitals had outreach centers (since they are in outer suburbs, this is a very likely way of increasing penetration into rural areas), and directed marketing towards local employers (which too increases the ability to attract and retain patients). Financially, the dominant strategy for this group was reflected in higher than average prices and markups, a high cost of capital but not very highly capitalized relative to the others, consistent with the smaller facility and limited services. Operations were characterized by higher proportions of outpatients and births, average number of surgeries and relatively short stays within the system. Human resources reflected low intensity of nursing and medical staff, consistent with the size and range of services, though a high labor cost.

Coherence in Group 2

The dominant marketing strategy stressed more of a community/patient orientation than a physician orientation. There were a few hospitals that were not very patient-oriented either. These were located in the city rather than the suburbs. These hospitals had outreach centers but in terms of

Table 2. Group means: Business strategy patterns

Variable	Group 1	Group 2	Group 3	Group 4	Group 5
X location	−202.8	−35.727	−59.826	−22.909	−4.833
Y location	123.6	−14.636	−27.478	−13.455	−22.666
Medical education cost	−0.608	0.732	−0.276	−0.226	2.161
Proportion of Medicare	0.031	0.307	0.722	−1.349	−0.960
Proportion of Medicaid	−0.576	−0.345	−0.495	1.751	1.240
Bed size	−1.406	1.204	−0.097	−0.708	0.817
Scope of service index	0.022	1.388	−0.623	−0.805	1.247
Case mix index	−0.281	0.708	0.207	−0.788	0.291

directing their marketing activities to employers, there is almost an equal split. This is consistent with their overall location in terms of some being city hospitals and with access to employer groups. The outreach centers are potentially a source of synergy in this regard. Financially they had a high cost of capital, were not heavily capitalized and had high prices and high margins. These hospitals were similar to those in Cluster 1 on the operations side. The human resources dimension reflected high staffing intensity ratios for both nursing and medical staff, consistent with the nature of the hospitals. The cost of labor was also expected to be high, and was indeed such.

Coherence in Group 3

The suburban nature of the hospitals was further reflected in the relatively greater emphasis on community marketing than physician marketing. They had outreach centers and directed marketing activities towards employers, which given the size is one way of increasing the utilization of the hospital. The dominant financial strategy was similar to that pursued by clusters 1 and 2, though some hospitals had a relatively low cost of capital. All hospitals were below average on all the dimensions of operations, especially in terms of proportion of outpatients and births. The dominant human resources decisions were similar to those for cluster 1 hospitals, which again is not unexpected.

Coherence in Group 4

Here too, marketing focused more on patients and the community as opposed to physicians. They were characterized by satellite/outreach centers and equal likelihood of marketing to employers. Their dominant financial strategy indicated low costs of capital, relatively less capital intensive and low costs but high margins. The low capitalization is consistent with the relatively limited array of services. On operations some hospitals were characterized by relatively high outpatient visits, while others had very few. This dichotomy was reflected in the turnaround time in the system as well. All hospitals demonstrated low proportions of surgical visits and higher than average births. The human resources dimension reflects low intensity of nursing and medical staff, which again is consistent given the size of the facility and the nature of services being offered. However, the costs of labor were higher than average.

Coherence in Group 5

Their marketing was heavily skewed towards physicians as opposed to the patient which is highly consistent with the profile of a teaching hospital, since attracting and retaining the best medical talent is important to their overall mission of being a teaching hospital. Additionally, they had strong outreach programs which is one way of drawing in patients to the main campus for tertiary care. Their marketing effort towards employer groups was also relatively high. Financially these hospitals were highly capitalized, had a relatively low cost of capital but prices and costs that were much higher than average. On operations these hospitals were characterized by extremely high numbers of outpatient visits, short stays, and average numbers of surgical visits and births. The human resources dimension reflected high staffing intensity ratios, both for nurses and doctors, which is expected, given the size and nature of the hospital, as is the high cost of labor.

The dominant functional strategies for each of the five business strategy types in this maket have been described in the preceding section. Hospitals that pursued these dominant strategies were deemed to be pursuing a 'coherent strategy'. Accordingly, hospitals could be classified as having one or more (or even no) functional decisions coherent with the overall business strategy. The coherence score thus varies from 0 to 4. The distribution of hospitals with the respective coherence scores is presented in Table 3.

The dominant functional strategies for the total population of hospitals showed interesting patterns. For marketing, most of the hospitals seemed to follow the strategy of relatively greater marketing efforts directed towards the community/patients than physicians. There were also substantial numbers of hospitals that put relatively less emphasis on both physician and patient marketing. The market as a whole had a tendency to have both outreach centers and direct marketing efforts towards employers. These were not significantly different across

Table 3. Frequency counts of coherence scores

Total coherence score	Number of hospitals
0	7
1	20
2	30
3	13
4	1

groups. The dominant financial strategy within the industry was to focus on low costs of capital; to be less heavily capital intensive; and to keep prices low. This is reflective of the fact that financial viability is essential for mere survival in this market; and that cost containment is a fundamental reality for this industry in its current environment. A lack of financial strength can not be compensated for by expertise, skilled staff or even offering a wide range of services. Most hospitals in the study pursued a human resources strategy of low staffing intensity both for medical and nursing staff. There were a fair number of hospitals that had higher staffing intensity ratios, and these were the larger and teaching hospitals, where such a characteristic would not be unexpected. The costs of labor were high in the market as a rule, reflecting a critical component of the costs of providing medical care in this market. There was no single dominant operations strategy though a substantial number of the hospitals focused on providing greater outpatient care and relatively low inpatient surgeries, in an attempt to keep costs down. This was also reflected in the short stays and quick turnaround times. Almost equally, there were hospitals that kept the number of inpatient surgeries, births and outpatient visits much below average and also managed to have short stays. These were more likely to be hospitals that were smaller and had a relatively simple mix of cases and limited service offerings.[9]

Step 7: Validating the measure of coherence

The first step in establishing the validity of our measure of coherence was to look for content

[9] Details of group means are available from the authors.

or face validity. The industry analysis provided a strong basis for the market definition as well as the variables used to define business and functional strategy. These were abstracted to provide the strategic patterns that form the underlying elements of coherence. As discussed in the section on validating the clusters, the patterns of strategy identified, have substantial external meaning and are not merely statistical in nature. Based on an in-depth understanding of the hospital market in general, it is possible to develop a basic understanding of what strategies are considered coherent. For example, a teaching hospital is less likely to be involved in community PR activities than a community hospital. Since attracting the best medical talent is critical for a teaching hospital, the relative emphasis on physician PR activities might be higher than for a suburban/community hospital. Teaching hospitals are also more likely to have a higher proportion of staff—in all categories— and also higher labor costs.

A hospital with a more complex case mix, is likely to have longer lengths of stay, longer throughput times, and higher costs. Conversely, hospitals with simpler case mix indices will tend to have a higher proportion of outpatient visits as these tend to depress the case mix index, have lower costs and shorter lengths of stay. Hospitals that have a wider range of services typically have a greater asset base which is reflected in higher capitalization and higher costs of capital. However, hospitals that have a wide range of services stand to benefit from economies of scope reflected in lower costs.

Under economies of scale, larger hospitals will have the potential for lower costs. They will also have higher staff ratios and labor costs. To exploit scale economies these hospitals are also more active in marketing to the community, physicians and employers and have outreach centers. These help increase the volume/patient load. Smaller hospitals on the other hand may have a greater potential for turnover in terms of patient load.

The proportion of Medicare and Medicaid patients will impact the overall costs and lengths of stay factors, since a greater percentage of both will increase costs and lengths of stay. With respect to location, hospitals in the inner city and closer suburbs, especially larger ones, will be more likely than community hospitals to

Table 4. Expected coherent strategies

Functional area/variable	Group 1	Group 2	Group 3	Group 4	Group 5
Marketing					
Community PR	H	H	H	M	L/M
Physician PR	L	H	L	L	H
Outreach/satellite centers	H	H	M	L	H
Employer sales	L	H	M	M	M
Finance					
Low Cost Provider	L	L/M	L	L	M
% Capitalization	L	H	L	L	H
Costs of Capital	L/M	H	L	L	H
Human resources					
Medical staff	L	H	M	L	H
Nursing and other staff	M/L	H	M	L	H
Labor costs	M	H	M	H	H
Operations/production					
Outpatients	H	H	M	H	M
Turnover	L	M	M	L	M/H
Length of stay	L	M	M	L	H

H: above average; M: average; L: below average

attempt to increase their market penetration through active association with HMO and PPO arrangements. Community hospitals in the further suburbs, will place greater emphasis on attracting patients from the community and focus more on community relations than perhaps physician PR. Inner city hospitals might have a higher proportion of Medicaid patients which increase costs.

For each of the five business strategy patterns obtained, we present the functional strategies that are coherent, based on an understanding of the market (see Table 4). The strategies that are dominant for each of these five groups as discussed in the previous section, are presented in Table 5. A comparison of the two tables shows that most of the observed dominant strategies are indeed the coherent strategies. Thus, the content or face validity of the measure is established.

The next step was to examine the convergent validity of the measure. To establish convergent validity we examined performance differences across hospitals with coherent and noncoherent strategies, as well as the correlation between the measure of coherence and performance. Ideally, multiple performance measures need to be studied, and should include both general and industry specific measures. This is consistent with the argument that a single measure cannot encompass the total contribution of strategy to a firm's performance (Zajac and Shortell, 1989; Chakravarthy, 1986; Hansen and Wernerfelt, 1989). However, given certain data constraints, we report the results for the industry specific measure of occupancy. The operational definition is given in Table 1.[10]

[10] We studied two additional performance measures—return on assets and market share. In operationalizing both indicators we encountered data related problems. For ROA, the operating profits figure reported did not include revenues from charitable contributions, research and other related grants or for fund-raising activities. Similarly in computing market share, the share of admissions relative to all admissions

Table 5. Observed coherent strategies

Functional area/variable	Group 1	Group 2	Group 3	Group 4	Group 5
Marketing					
Community PR	H	H	H	M	L/M
Physician PR	L	L	L	L	H
Outreach/satellite centers	M/H	M	H	M	H
Employer sales	H	M	H	M	M
Finance					
Low cost provider	L	L/M	L	L	M
% capitalization	L	H	L	L	H
Costs of capital	H	H	L	L	L
Human resources					
Medical staff	L	H	H	L	H
Nursing & other staff	M/L	H	M	L	H
Labor costs	H	H	M	H	H
Operations/production					
Outpatients	H	H	L	H	H
Turnover	M	M	L	L	M
Length of stay	L	L	L	L	L

The data were standardized to mean = 0 and s.d. = 1

Performance differences across different patterns of strategy

First, performance differences were examined across different business strategy patterns, through an analysis of variance. At $\alpha = 0.01$, the *F* statistic was not significant, indicating no performance differences. This is consistent with previous empirical work (e.g., Cool and Schendel, 1987; Fiegenbaum and Thomas, 1990). This implies that each of these five strategies is equally viable and likely to lead to success.

Next, performance differences across the different patterns of functional strategy were examined, to assess which pattern(s) within each functional strategy were associated with the highest performance (in the entire study sample). The finance strategy pursued by the majority of the hospitals

in the MSA is not an accurate descriptor of market share in a market that is fragmented as in this case. In the absence of information on specific competitors, it was not possible to derive a reliable meaure of market share. Consequently, any results involving these two performance indicators might not be sound for this particular study.

did not have the highest performance of all the groups. In fact, the average occupancy for this group of firms was among the lowest. The highest average occupancy was associated with a strategy pursued by very few of the hospitals.

For marketing, the performance differences across the four patterns were not significant at the $\alpha = 0.01$ level. For human resources, there were significant differences. The highest occupany was shown by hospitals that pursued one of the two dominant human resources strategies. In the case of the other, the occupancy rates were average. The non-dominant strategies had generally lower performance values than for the dominant strategies.

In the case of operations, there were significant differences as well. Of the three types of operations strategies pursued largely in this market, two showed the highest occupancy figures, while the third was below average, but still higher than for the nondominant strategies.[11]

[11] Details of the analysis of variance and the cluster means on occupancy can be provided.
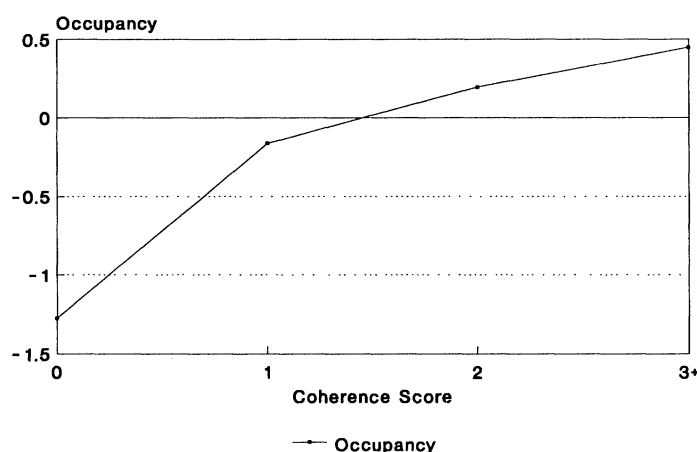
Figure 2.   Coherence–performance relationship

Performance differences and coherence—establishing convergent validity

The next stage examined performance differences (on occupancy) across varying levels of coherence. The coherence measure was positively correlated with occupancy ($r = 0.43$). Plotting mean occupancy associated with varying levels of coherence (Figure 2) suggests a nonlinear relationship between the two.[12] A trend analysis shows the coherence–performance relationship to be monotonic.

An examination of performance differences across levels of coherence, showed significant differences on occupancy ($F_{66}^4 = 4.96$) which is a relevant and critical performance measure for this industry.

DISCUSSION OF RESULTS

Occupancy is an industry-specific performance indicator and is widely used in the evaluation of hospital productivity and efficiency. Higher occupancy rates may be a function of various factors from providing a high quality product to higher demand stemming from a beneficial location or by charging lower prices (Noether, 1987). A study of hospital closures (Burda, 1989) reports that hospitals that closed had average

occupancy rates of 27 percent versus 47 percent for those that were open. In fact, excess capacity and lack of inpatient demand (both factors that negatively impact occupancy) are among the top factors that contribute to hospital closures. Typically, occupancy rates have been declining in the U.S.A. In 1986, the average U.S. community hospital had a 64.3 percent occupancy rate (a decline of 0.9% over the previous year, and a decline of 13.8% since 1976).

Declining occupancy has paralleled declines in inpatient-days, and a shift to greater outpatient care (which has been stimulated by a change in the way hospitals are reimbursed for inpatient versus outpatient care, as well as the drive to push down hospital costs).

Low occupancy rates typically create a negative impact on costs triggering higher costs and higher prices. A failure to stabilize occupancy by reducing the number of beds leads to problems of excess capacity and inefficiencies. Efficiencies in operations (i.e., quick turnaround through the system), proportion of long versus short stay cases (including outpatient visits, births and surgical procedures) are factors that impact occupancy. In addition, for a service operation like a hospital, smooth operations are critical for success/high performance. At the same time, a service has a greater 'people' dimension than a manufacturing operation. For a hospital, the medical and nursing personnel play a critical role in the structural determinants of quality of care provided (Scott and Flood, 1985; Donabedian, 1985). Better quality care either through increased

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[12] As there was only one hospital with a total coherence score of 4, it was combined with those with coherence scores of 3 to give the category of coherence 3+.

demand or directly, is likely to have a positive impact on occupancy.

CONCLUSION, LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

The contribution of this study lies in the development of a measure of the internal consistency or coherence between a firm's business and functional strategies. This measure provides a replicable assessment of coherence, which is theoretically driven and strongly grounded in industry analysis. The study provides both content and convergent validity for the measure.

The present study was a cross-sectional analysis. Ideally, strategy should be examined longitudinally, since the impact of strategy occurs over time. Future research might examine the short-run and long-run coherence of strategies and the implications of this for performance. Also, we have illustrated the application of the measurement process in a single industry. We would encourage the application of this process to other industries, to provide greater external validity for the measure of coherence, especially with respect to its relationship with broader measures of performance.

On a more general level, coherence is likely related to co-alignment and strategic fit. Future research should attempt to understand the relationships between a firm's environment, organizational structure, business strategy and the coherence of its functional strategies with the business strategy. This would build on the recent work by Chorn (1991), and Venkatraman and Prescott (1990), that provide measures of the fit between strategy and structure, and co-alignment between strategy and the environment. It is possible that the different types of fit could explain various performance measures to different degrees. There could be interaction effects between strategy coherence, strategic fit and co-alignment, with firms that have all three types of fit being the highest performers in the industry.

Developing valid measures for each construct is an important first step in the test of any such theoretical propositons. The measurement process presented in this study can be applied to develop measures for strategic fit and co-alignment that are independent of criterion variables such as

performance, and that look at a firm as a gestalt as opposed to a bivariate entity.

A longitudinal examination of coherent and non-coherent firms might be illuminating in identifying the evolution of industries as certain firms spin-off in apparently non-coherent patterns which might be innovative responses to the environment (for example) and thus long term success stories. This would imply an interaction between coherence and the strategy–environmental co-alignment. A longitudinal study could also test the inertial effect of a large set of similar competitors that magnify the importance of resolute consistency and coherence, to the detriment of experimentation to better cope with environmental change. Finally, it would help clarify the role of different functional areas in industries where diverging from other coherent cohorts leads to improved or decreased performance.

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