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Interdependencies in Organization Design: A Test in Hospitals

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Abstract: While there have been numerous empirical and theoretical contributions in both the accounting and management literatures examining independently the implications of strategy and structure on control system design, there has been little research examining the interdependencies among the various elements of organization design. Hospitals represent an empirical setting where a diversity of structural arrangements and strategic orientations are both readily observable and recognized as having implications for other elements of control systems. Using data collected from chief executive officers and medical directors in hospitals, this study examines how strategic choices influence adaptations in structure and performance measurement systems. The findings from this study suggest that there are significant interdependencies between strategic choice, structure, and performance measurement system design and that when the separate elements of organization design complement each other, performance is enhanced.

INTRODUCTION

In the context of rapid change in both the nature and extent of global competition, we have seen the genesis of many organizational developments. The prevalence of strategies focused on innovation and flexibility, the growth in importance of knowledge and expertise relative to other assets, the development of structures described in terms of self-managed teams or work group autonomy, and the design of strategic management control systems are among the readily observable changes. These phenomena have been examined in many literatures. The management literature has considered both the broad organizational design parameters that support flexibility and innovation and, at a more micro level, the management of structures based on networks, teams, or autonomous work groups (Dean et al. 1992; Miles and Snow 1992; Lei et al. 1996; Sewell 1998). The accounting literature has examined the influence of new strategies on control system design both empirically (Daniel and Reitsperger 1991; Abernethy and Lillis 1995; Ittner and Larcker 1995, 1997; Bouwens and Abernethy 2000) and normatively (Nanni et al. 1992; Simons 1995; Kaplan and Norton 1996). The accounting literature has also devoted some attention to assessing the efficacy of modifying

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management structures and systems of control in organizations where workers have been granted considerable levels of autonomy (Preston et al. 1992; Abernethy and Chua 1996; Scott and Tiessen 1999). There have, however, been few attempts to integrate these literatures.

The purpose of this paper is to develop a model and examine empirically the interdependencies between strategy, internal management structures, and performance measurement systems (PMSs). We examine whether there are any synergistic benefits when strategy and particular design choices complement each other. Our study is undertaken using data collected from clinical units within large public teaching hospitals in Australia. The sample has sufficient diversity in strategic orientations, structural arrangements, and PMS design to enable us to test our model. In common with the hospital sector in Canada, the U.K., and many other European countries, Australian hospitals are primarily government funded.[1] At the time of this study, hospitals had been subject to the implementation of market-based reforms designed to encourage them to operate entrepreneurially, to be more responsive to consumer demands, and to implement systems to improve operating efficiencies (Abernethy and Stoelwinder 1995; Abernethy and Chua 1996). A fundamental change introduced as part of these reforms was the introduction of prospective funding based on type and volume of patients treated (generally known as DRG funding).[2] Hospitals now contract with the central funding authority for payment of services at an agreed rate. This contractual arrangement resembles the relation between hospitals in the U.S. and third-party payors.

While the third-party payor in the Australian setting is the government, the new contractual relationship between government and hospitals has significantly reduced centralized control and regulation of hospital behavior. Hospitals are considered as independent entities and have autonomy over the types of services provided, the mix of patients treated, and the volume of patients treated. Their autonomy is reflected in the new governance structures that were introduced as part of the reform process. These structures mimic those found in the private commercial sector (Abernethy and Chua 1996). Chief executive officers (CEOs) of hospitals are appointed by the Board of Management and are directly responsible to the Board rather than to the central funding authority. The objective of both of these changes was to reduce the degree of regulation and control by central authorities and to create a commercial ethos within the hospital sector.[3] The Board and the CEO have responsibility for both the strategic and operational management of the hospital and they have the authority to introduce new structures and administrative systems. Thus, the hospitals in our sample had the autonomy to determine their own strategic objectives and the means of achieving those objectives. Changes in the regulatory environment, coupled with increased cost constraints, created the catalyst for hospitals to adapt their internal structural arrangements and implement new and improved performance measurement systems (Abernethy and Stoelwinder 1995; Abernethy and Chua 1996). Hospitals

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[1] It was necessary to select hospitals that were relatively large. As the majority of large hospitals are public hospitals, only public hospitals are included in our sample.

[2] Diagnosis-related-groups (DRGs) became the basis for reimbursing Medicare patients in the U.S. in the mid-80s and it has since been adopted by many countries (Harper 1985; Wood and Thomas 1985; Duggan 1994; Hanson and O'Dea 1994). While the DRG classification system has been used as a basis for reimbursement systems in various western economies, there are significant variations in the way in which the system has been used (see Davis 1999; Le Grand 1999; Tuohy 1999, for an overview of changes in regulatory policies in the U.S., Canada, the U.K., and Australia).

[3] See statements made by the then Minister for Health in a policy statement (Victorian Department of Health and Community Services 1993).

in other Western economies are experiencing a similar environment (Shortell et al. 1996; Lee and Alexander 1998).

Given the external and internal imperatives described above, the hospital sector provides an opportunity to examine the relations among strategy and control system design constructs in a cross-sectional empirical study. The results enable us to contribute to the ongoing debate as to the efficacy of the strategic choices currently being implemented in this sector (Molinari et al. 1993; Noy and Lachman 1993; Lee and Alexander 1998). By providing some empirical evidence on the organizational outcomes that result when strategy, structure, and performance measurement are designed to complement each other we hope to make three contributions to the extant literature. First, our results will shed some light on the conditions that influence the efficacy of self-managing structures. While other sectors of the economy are just beginning to recognize the benefits of self-managing units, clinical units within hospitals have traditionally operated as autonomous work groups. In contrast to the positive benefits being promoted by the popular management literature, the self-management of clinical units in hospitals has often resulted in adverse organizational consequences (Weiner et al. 1987; Scott 1993). Many of the current adaptations to the structural arrangements in hospitals and the implementation of PMSs have been to overcome some of the dysfunctional consequences associated with traditional hospital structures. This study attempts to identify the conditions that influence the efficacy of self-managed work groups. Second, an examination of the role and influence of performance measurement systems embracing financial, quantitative, and qualitative elements provides an opportunity to contribute to the ongoing debate on the consequences of incorporating these elements into the design of these systems. Finally, we hope to contribute to the limited understanding we currently have of accounting and related organization design issues in an industry that is one of the fastest growing and most significant sectors of the economy (Ezzamel and Willmott 1993; Abernethy and Chua 1996; Evans 1998; Mensah 2000).[4] While our study is undertaken in the hospital sector in Australia, it has implications for the hospital sector in other countries with centrally funded systems as well as in countries dominated by private sector interests.

The following section builds on prior literature to develop a model that links strategy, structural autonomy, performance measurement systems, and organizational outcomes. We develop the model by integrating the separate literatures. We conceptualize the constructs used and develop the theoretical foundations for each link in the model. The study method, measurement of variables, results, discussion, and directions for further research follow.

DEVELOPMENT OF THEORETICAL MODEL

There is a convergence of attention and concern among managers and management scholars over what determines organizational success and failure. A core concept in research in this field is the notion of "fit." The consensus in the management and accounting literatures is that organizational survival is dependent upon achieving a fit between an organization's strategy, structure, and management processes (Miles and Snow 1992; Fisher 1998). Successful organizations are those that implement structures and management processes that facilitate the

[4] The health care industry is one of the largest industries in most developed countries. Health care expenditure as a proportion of GDP is 13.6 percent in the U.S., Canada 9.2 percent, Australia 8.6 percent, U.K. 6.9 percent. Unlike the manufacturing sector, it is one of the fastest growing industries, with expenditure in the U.S. expected to reach 16.2 percent of GDP in 2008 (Smith et al. 1999).

achievement of their strategic choices. Less successful organizations typically exhibit poor fit. We develop the theoretical model in this study by examining the separate links that result in a good fit. We address three questions. First, we examine whether the choice of strategy influences the degree of autonomy granted to subunits. Second, we assess how the organization ensures that autonomous units are held accountable for their decisions. Finally, we are interested in the consequences of these adaptations on organizational outcomes. In other words, if strategic choice drives the demand for adaptations to internal structural arrangements, then how does this manifest itself in the performance measurement system (PMS) and what are the consequences? Each of the links in the model is developed in turn.

Strategic Choice and Structural Arrangements

There is now widespread agreement in the management literature that new organization structures arise to cope with changes in environmental conditions (Henderson 1989; Miles and Snow 1992). The turbulent environment faced by most firms since the 1980s has forced top management to rethink their competitive strategies and the internal structural arrangements necessary to implement these strategies effectively. Research attention has focused on assessing the type of structural arrangements that will be most effective in supporting the pursuit of "new" competitive priorities in manufacturing, such as flexibility, responsiveness, and product innovation (Abernethy and Lillis 1995; Gupta et al. 1997; Bazzoli et al. 1999).

In the hospital sector, the emphasis on service innovation is an important dimension of competitive strategy (Shortell et al. 1996). A hospital's commitment to service innovation can be located on a continuum. At one end of the continuum, hospitals engaged in service innovation are exposed to rapidly changing markets and are continually developing new service offerings. Such hospitals respond quickly to changes in technology and market demand (Shortell et al. 1996). A hospital that prides itself on having the latest diagnostic testing facilities or highly specialized, state-of-the-art medical equipment would represent this end of the continuum. At the other end of the continuum, hospitals compete by improving and expanding a relatively narrow and stable set of services. A community-based hospital providing routine obstetrics, general medicine, and general surgery would fit at this end of the continuum. This type of hospital does not search outside its domain for new market opportunities. It would experience relatively low rates of change in the services offered. It maintains market share through efficiency.[5]

The pursuit of innovation as a strategic priority has implications for the type of structural arrangements needed to facilitate innovative and creative activity (Miller 1987; Naman and Slevin 1993; Miles et al. 2000). Effective, innovative organizations must respond quickly to market forces (Habib and Victor 1991; Slater and Olson 2000). They need to be responsive to changes in customer demands by continually assessing the viability of products and services and developing new products and services to satisfy new and changing demands (Slater and Olson 2000). Structural arrangements are critical in enabling the organization to be responsive. The structure must be able to facilitate the efficient flow of information both horizontally and vertically throughout the organization and encourage individual work units to collaborate with each other during the production of core

[5] This is not to say that these organizations would not be involved in innovative activities. However, these activities would be related to process innovations directed toward improving their existing set of offerings.

services (Bouwens and Abernethy 2000). The creation of autonomous work units is one means of achieving this (Lawler 1993; Cohen and Ledford 1994; Scott and Tiessen 1999). Delegating autonomy to operating units performing the work facilitates more effective exchange of information between the organization and its external environment. These units are closer to the market and are better able to acquire and interpret information relating to the outputs required by the market and where to source the necessary inputs (Kaplan and Atkinson 1998). Thus, they are more knowledgeable of market conditions and able to make the necessary adaptations in response to the continual changes demanded by the external environment. Creation of autonomous work units also provides the potential for work units to collaborate, to share resources, increase valued outcomes, and/or produce those outcomes more effectively (Lei et al. 1996; Gupta et al. 1997).

In contrast, the typical multilevel hierarchical structure, where decision making is centralized, is limited in the amount of information it can process effectively (Galbraith 1977; Daft and Lengel 1986). This type of structure is considered relatively inflexible and is unable to respond readily to changes in the requirements of external stakeholders. Centralized structures often result in delays in decision making as information tends to be communicated through vertical channels (Burns and Stalker 1961; Gordon and Narayanan 1984). While there is some argument that the development of sophisticated technology has enabled these delays to be minimized, it is unlikely that these systems will overcome the cognitive limitations of centralized management. These limitations reduce senior management's ability to process large volumes of information (March and Simon 1958) and in turn influence their ability to effectively control and coordinate the core operating activities performed at lower levels within the organization. In the hospital setting this is compounded, as top management also does not have sufficient clinical expertise to make optimal decisions on clinically related matters (Young and Saltman 1985).

Given the cognitive and coordinative limitations of senior management, we would expect to observe an internal management structure with autonomous work units. However, the creation of autonomous work units is not costless. It creates the potential for goal-incongruent behavior, suboptimal decision making by lower-level management, and decreased loyalty toward the organization as a whole (Zimmerman 1997; Kaplan and Atkinson 1998). We would, therefore, only expect to observe high levels of autonomy in operating work units under certain conditions. This is likely to be the case for hospitals pursuing service innovation as a strategic priority. This type of strategic priority requires a greater diversity of clinical expertise throughout the organization, as well as sensitivity to market opportunities and threats, strong service-based market assessments, and preparedness to respond quickly to market changes. To cope with these increased demands, hospitals require structures that facilitate functional coordination and effectively harness the knowledge and expertise of clinical managers in interpreting the clinical and organizational implications of market changes (Galbraith 1977; Dougherty and Hardy 1996; Slater and Olson 2000).

Managers of clinical units in hospitals are generally physicians who have traditionally had considerable autonomy over clinical processes and patient care outcomes. This autonomy gave physicians almost complete control over core operating tasks but with no responsibility for the financial consequences of clinical decision making (Young and Saltman 1985; Weiner et al. 1987; Burns et al. 1993). It is argued here that the decision to delegate both clinical and financial management to clinical units will be influenced by the cognitive and coordinative demands imposed by a strategic focus on service innovation. These demands are

likely to be best met by increasing the autonomy granted to clinical units over output and resource management decisions. In contrast, hospitals that do not pursue service innovation, *ceteris paribus*, face less diversity and change in their clinical mix, have fewer information requirements (Bouwens and Abernethy 2000), and, thus, may not face the information constraints associated with a centralized structure. Organizations tend to remain centralized in this situation to minimize the potential for goal incongruence and dysfunctional behaviors that delegated decision making often creates (Shortell et al. 1996).[6] Our expectations are summarized as follows:

H1: There will be a positive relation between the strategic emphasis on service innovation and the extent of autonomy granted to lower-level work units.

Autonomy and Performance Measurement Systems

Managing the competing demands of autonomy and accountability has long been recognized as important in the research literature (Solomons 1965; Lawrence and Lorsch 1967; Vancil and Buddrus 1979). The issue is beginning to receive renewed attention in the public sector arena as governments attempt to manage the conflicting tensions between demands for decentralization and greater accountability for results (Bromwich and Lapsley 1997; Mouritsen and Bekke 1997; Groot 1999). Increasing attention is now being devoted to the development of results-oriented service accomplishment and efficiency measures in the public sector in general (Lapsley 1994; Ittner and Larcker 1998; Jones 1999) and more specifically in the hospital sector (Forgione 1997; Jones and Dewing 1997; Chow et al. 1998).

The major concern in the accounting literature has been understanding the mechanisms required to encourage goal congruence when lower-level management are granted decision-making autonomy (Flamholtz et al. 1985). We are interested in the antecedent conditions influencing the design and use of PMSs in work units performing the core services of a hospital, namely clinical units. We conceptualize PMSs as comprehensive accountability systems designed to capture the activities performed in clinical units. Consistent with the recent literature concerned with the development of PMSs, our performance measurement construct includes a comprehensive set of criteria embracing relevant financial and nonfinancial performance measures. We classify the measures into two dimensions, clinical management criteria and resource management criteria. Performance measures associated with resource management include cost and productivity data, while clinical management criteria include measures relating to patient care and research as well as qualitative criteria considered important for the effective management of the clinical unit.

We expect that the importance attached to these measures will be influenced by the degree of autonomy delegated to clinical units. The creation of autonomous work units limits the ability of top management to closely monitor the actions of clinical units (Merchant 1998). The nature of the work also precludes the use of accountability mechanisms (e.g., rules and standard operating procedures) that attempt to prescribe desired actions of subordinate managers (Abernethy and

[6] In this health care context, even in relatively centralized hospitals, physicians will have considerable autonomy through their control of clinical processes and patient care. Thus, our expectations in relation to autonomy reflect a somewhat truncated scale between moderate and high, rather than low and high.

Stoelwinder 1995). Top management do not have the expertise required to design and implement standardized operating procedures that would be relevant for clinical work. It is also unlikely that such systems would be able to overcome the communication problems between those responsible for performing the activities, namely the clinicians, and those responsible for overall management (Jonsson and Solli 1993). It is well recognized that dominant professionals, such as physicians, will strongly resist any attempts by management to impose bureaucratic rules and procedures that threaten their autonomy (Freidson 1975). Clinicians prefer to work in settings unencumbered by any form of obtrusive accountability mechanisms, other than the norms and values imposed by the profession itself (Abernethy and Stoelwinder 1991), or what Ouchi (1977) and Merchant (1998) classify as "clan" or "personnel" forms of control. It is, however, unlikely that top management will be prepared to rely solely on these forms of control as the potential control loss is high where clinical units have been delegated autonomy over both input and output decisions. Performance measurement systems that capture the results of clinical activities serve the accountability role well. They create accountability for outcomes while at the same time enabling professionals to maintain their desired autonomy over the "means" associated with performing complex tasks. As argued by Jonsson and Solli (1993), this form of control can bridge the communication gap between professionals and management by translating primary activities (i.e., professional activity) into secondary effects (i.e., quantifiable outcomes).

In sum, we expect that increased autonomy will be accompanied by increased accountability, reflected in greater importance attached to PMSs. It is expected that the importance of PMSs will increase as an organization increases the autonomy of work units. Furthermore, as autonomy increases beyond clinical outcomes to embrace both inputs (management of financial resources) and outputs (volume and mix of clinical services), it is expected that the importance attached to performance measures will increase in relation to both measures of resource usage and clinical management.

H2a: There will be a significantly positive relation between the level of autonomy and the extent of use of resource management performance (RMP) criteria.

H2b: There will be a significantly positive relation between the level of autonomy and the extent of use of clinical management performance (CMP) criteria.

Strategy, Structural Autonomy, and Performance Measurement Systems

The previous sections have developed two links in the model: first, the link between a strategic commitment to service innovation and the degree of autonomy granted to work units; and second, the relation between autonomy and accountability through performance measurement. What is not so clear from the literature is whether there will be any direct relation between service innovation and the strategic importance of PMSs.

The literature examining empirically the relation between strategy and use of accounting performance measures has produced conflicting results. Some studies have indicated that prospectors (or differentiators) will rely on accounting measures to a lesser extent, some have indicated that they use these measures to a greater extent, and some studies have been unable to find any evidence of a relation.[7]

[7] See Chapman (1997) for a review of this literature.

Nonetheless, competitive strategy has emerged in the literature of the 1990s as the dominant logic behind PMS design (Chapman 1997). Despite considerable research efforts, however, we still have very little understanding of how strategy impacts on PMSs, nor do we understand the role of structure in the design of effective PMSs. Part of the difficulty is that the literature has shifted in the emphasis placed on structure and strategy as the drivers of PMS design, with little explicit recognition of their joint or relative importance. The RAPM (reliance on accounting performance measures) literature, for example, focused almost exclusively on the role of *accounting* performance measures in the *evaluation* of subordinates.

More recent performance measurement frameworks are less accounting-centric. They also move away from the assumption that the dominant role of PMSs is to evaluate subunit performance. Instead the emphasis in these frameworks is the role of organizational strategy as the driver of PMS design choices. The Dixon et al. (1990) framework assesses how PMSs can be designed to provide a set of mutually reinforcing signals that direct subordinates' attention to strategically important criteria. The Balanced Scorecard (BSC) has a similar objective. Kaplan and Norton (1996) promote the BSC as a mechanism of strategic monitoring and learning rather than performance accountability. While the BSC literature has focused increasingly on the role of the BSC in the evaluation of subunit performance (Kaplan and Norton 2001; Lipe and Salterio 2000, 2001), the evaluation emphasis is on reinforcing the communication and goal alignment strengths of the BSC rather than accountability. Similarly, the performance measurement framework developed by Simons (1995) is primarily concerned with how formal control systems are used to manage strategic uncertainties. While Simons' (1995) framework recognizes the role of PMSs in measuring subordinates performance, this role is only one of the levers of control used to implement strategy and monitor strategic uncertainties. In sum, these performance measurement frameworks draw on the strategy literature, which views performance measurement primarily as a strategic information system and secondarily as a mechanism of performance accountability. Performance measures are seen as an information resource used to monitor the organizational impact of strategy implementation rather than monitor the performance of subunits.

If PMSs primarily serve an informational role, rather than a monitoring and evaluation role, it is most likely that we would observe a direct relation between strategy and PMSs, as these systems would be designed to facilitate strategy implementation. However, if the monitoring role is dominant, then we expect any observed relation between strategy and PMSs will be a result of management's choice to adapt the structural arrangements to suit the requirements of its strategic priorities. If this is the case, then the inconsistent findings from prior empirical studies seeking to link strategy and PMS design may have arisen because this literature has ignored the influence of structural autonomy.

As argued earlier, there is strong support for the argument that strategy is a significant determinant of structural autonomy. We expect that the importance attached to PMSs is more likely to be directly affected by the delegation of autonomy to lower-level management rather than attributable to strategic choice. It is the accountability requirement of top management, created by the implementation of autonomous work units, that will be the important determinant of PMS design. Therefore, the demand for increased accountability stems from the decision to create autonomous work units, rather than from the choice of strategy. It is the adaptation of the structural arrangements in response to the choice of

strategy that creates the accountability problem, rather than strategy itself. In other words, the relation between strategy and the use of PMSs is not a direct one. Any observed relation among them is due to the decision to create autonomous work units. Our expectations are as follows:[8]

H3: The relation between the emphasis on service innovation and the extent of use of the performance measurement system is an indirect one operating via structural autonomy.

The Consequences for Organizational Outcomes

We are interested in assessing the organizational consequences when management make adaptations to their strategy, structure, and PMSs. Following Steers (1977) and others (Pennings 1975; Campbell 1979; Goodman and Pennings 1979), we adopt a multidimensional view of organizational performance and incorporate organizational criteria of relevance to the hospital industry, namely criteria relating to financial viability and performance in terms of their patient care services and their medical and teaching programs.

We have developed a set of arguments that suggests that there are sequential adjustments flowing from choice of strategy.[9] We do not expect a direct relation between strategy and organizational performance outcomes, nor do we expect a direct relation between structure and organizational outcomes. There is no *a priori* reason why a strategic commitment to innovation, in itself, will have positive organizational outcomes. Improved organizational outcomes occur when management facilitates the implementation of strategic priorities through changes in their internal structures and PMSs (Miles and Snow 1992). These expectations are summarized in H1–H3. Similarly, there is no *a priori* reason to expect that one structural form will be superior in terms of organizational outcomes than another.

We are not only interested in assessing the individual links in the model, but also in assessing the "fit" of the specified model. That is, we wish to assess the consequences when the interdependencies among the elements of the model are considered in their entirety. There is considerable support that organizational outcomes are enhanced when the strategic, structural, and PMS choices made by management complement each other. For example, Milgrom and Roberts (1995) demonstrate that if only one element of organizational design is changed, then this will not even come "close to achieving all the benefits that are available through a fully coordinated move, and may even have negative payoffs." Similarly, Rotch (1993) argues that conflict between the separate components of organization design or even absence of support can be a source of weakness. In the context of the model developed here, we expect that the relation between strategic emphasis on service innovation and organizational outcomes will be enhanced when the appropriate structure and PMSs are implemented. According to the theory developed here, we expect that the best "fit" of the model will be where the emphasis on service innovation influences the extent of structural autonomy and this, in turn, influences the extent of accountability through use of PMSs. This can be stated as follows:

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[8] It should be noted that due to the ambiguity in the results of prior research studying the strategy/PMS link, the analytical approach adopted in this paper enables an assessment of whether the relation is direct or indirect via structure.

[9] The model developed here implies that "structure" precedes choice of PMSs. It is, however, possible that adaptations to strategy occur simultaneously. The nature of the data used to test these relations precludes an assessment of the timing of these adaptations.

H4: The relation between the strategic emphasis on service innovation and organizational outcomes is not a direct one but rather an indirect one operating via structural autonomy and the use of performance measurement systems.

A summary of the model is depicted in Figure 1.

METHOD

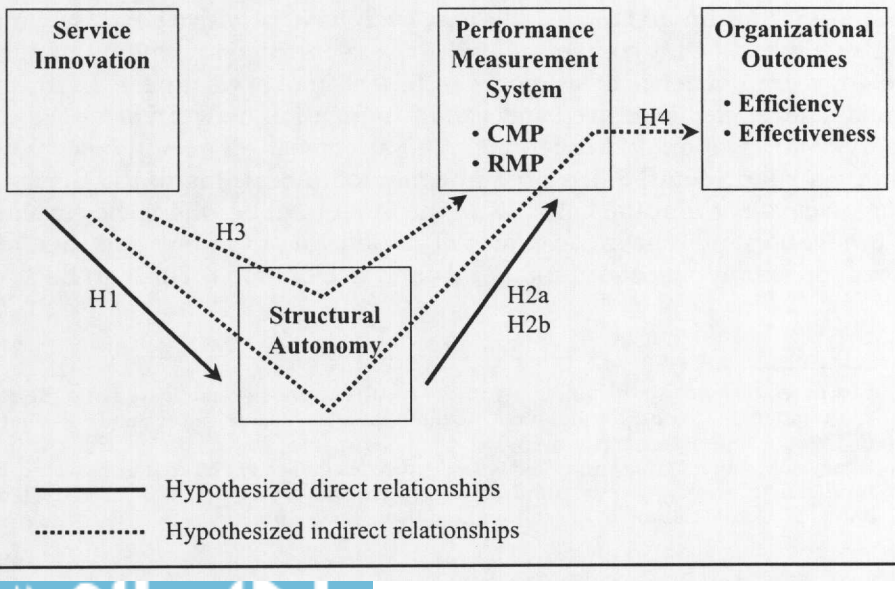
Sample Selection

Data were collected from chief executive officers (CEOs) and medical directors (MDs) of large Australian public hospitals identified from the 1995 Hospital and Health Services Directory. This source provided the name of the CEOs and MDs, and other relevant statistical data that assisted in diagnosing any bias associated with nonresponse. Questionnaires were initially distributed to CEOs and MDs in 149 hospitals. Two sets of respondents from each hospital were used to reduce concerns of common-rater bias when survey data are employed in path models (Kren 1997).[10] Responses for the service innovation and organizational effectiveness variables were obtained from the CEOs, while responses for structural autonomy and use of PMSs were obtained from the MDs. It was considered that the CEOs' perception of strategic position and assessment of organizational effectiveness would be the most relevant reference point. The extent to which decision making was decentralized to clinical units and the use of performance measures for assessing clinical performance was considered best obtained by reference to the MDs as they would be more involved with the day-to-day operations of clinical units.

The response rates were high with 65 percent of useable questionnaires returned by the CEOs and 51 percent returned by MDs. This resulted in 56 matched sets of data for use in the analysis. High response rates minimize problems

[10] Even with two respondents the potential for common-rater bias is not completely eliminated. However, it was necessary to make some compromise as we considered it important to select those respondents who were considered to be the best informed in terms of the constructs of interest.

FIGURE 1
Hypothesized Model



associated with nonresponse bias. Nevertheless, we tested the data for any potential nonresponse bias. First, tests of differences between respondents and nonrespondents were undertaken. These tests were restricted to published data and included a test of difference for two size variables, namely, the number of inpatient beds and total operating expenditure, and the hospital's geographical location (i.e., state). Second, a comparison of means on all measured variables was undertaken, comparing the early and late respondents on the assumption that late respondents would have similar characteristics to nonrespondents. None of these tests produced significant differences, suggesting the absence of any obvious nonresponse bias.

The data indicated that CEOs had been in their current position for an average of 3.8 years and employed by the hospital for an average of 5.9 years. Medical directors had been with the hospital for 7.8 years and in their current position for an average of 3 years. Hospitals had, on average, 364 inpatient beds with operating expenditure of approximately U.S.$52 million.

Measurement of Variables

Development of measures for the variables was based on prior instruments where possible or developed using pilot testing methods. The pilot study involved semi-structured interviews with hospital CEOs and was undertaken to ensure that the variables of interest were relevant to this industry and to remove any ambiguity in the wording of the measures. A copy of the measures used in the analysis is included in the Appendix. The measurement of each variable is discussed in turn.

Service Innovation

We used the strategic typology developed by Miles and Snow (1978) to capture the extent to which a hospital responded to market needs or opportunities by making changes in its service offerings. This typology is intuitively appealing as the description of a prospector relates directly to the service innovation construct. It has also been used extensively, tested for theoretical robustness (Doty et al. 1993), and subjected to considerable psychometric assessment (Snow and Hrebiniak 1980; Hambrick 1983; Shortell and Zajac 1990). Miles and Snow (1978, 51, 58) describe a prospector as one that is "seeking always to be first among the developers of new products" and whose "prime capability is that of finding and exploiting new product and market opportunities." We are not, however, interested in whether a hospital fits into the "prospector" or "defender" classification. Rather, we are interested in the degree to which they are committed to service innovation as reflected in the degree of change in their service mix. Thus, we view service innovation as a continuum and operationalize the construct by providing two descriptions of a hospital's strategic stance. One end of the continuum represents a hospital involved in little change and the other end represents a hospital that is continually changing its service offerings. CEOs were asked to rate the degree of change in service offerings on a scale of 1 to 7 along this continuum.

Structural Autonomy

A four-item measure based on the Govindarajan (1988) instrument was used to capture the structural autonomy construct. The instrument focused on the delegation of decisions relating to inputs and outputs and required medical directors to indicate the extent to which these decisions had been delegated to managers of clinical units. The four items were summed for use in the analysis. Factor analysis indicated that the scale was unidimensional and the Cronbach (1951) alpha coefficient of 0.83 provides support for the use of the summed measure.

Performance Measurement System

An instrument was purpose-developed to capture the PMS construct based on prior field research and a review of the relevant literature. We started with the early work of Hopwood (1976) and reviewed the research that followed (see Hartmann 2000; Otley and Fakiolas 2000). Much of the literature based on Hopwood (1976) focused only on the financial dimensions of the Hopwood instrument. However, more recent research has incorporated both quantitative and qualitative performance criteria when examining performance measurement system design (Ittner and Larcker 1998). We also reviewed studies in the hospital and other service industries that have incorporated concepts similar to the one of interest here (Abernethy and Stoelwinder 1991; Smith 1993; Lee et al. 2000; Watkins 2000).

The measurement instrument used in this study included seven items that were considered to be relevant in the measurement of clinical unit performance. The seven items were factor analyzed and a two-factor structure emerged. The factor structure provided support for the two dimensions of PMSs. Two items (cost performance and throughput) represented one factor. The remaining items represented more qualitative measures of performance. The correlation between the two items in the first factor was 0.56, while the Cronbach (1951) alpha coefficient for the five-item factor was 0.84. This provides support for summing the two items relating to measures associated with resource management performance (RMP) and the remaining five items to represent the clinical management performance (CMP) criteria.

Organizational Outcomes

Organizational outcomes in the hospital sector include both efficiency and effectiveness dimensions. We developed an instrument in the field that required senior management to state the criteria that they believed were most important in determining effective hospital performance. Following an assessment of the field study data, an instrument was developed that required the CEOs to rank their perception of their hospital's performance along six criteria.[11] A factor analysis of the six items indicated that there were two outcome dimensions that closely represented an "efficiency" dimension and an "effectiveness" dimension. These two factors accounted for nearly 60 percent of the variance. The two items relating to the efficiency dimension related to costs and the ability to win resources. The remaining four items captured outcomes relating to quality of patient care, teaching, and research. A Cronbach (1951) alpha coefficient for the four items was computed and indicated that the items could be used reliably as a multi-item measure ($\alpha = 0.68$). It was thus considered reasonable to sum the two items to represent efficiency outcomes and the four items to represent effectiveness outcomes. The descriptive statistics and correlations among the variables are presented in Table 1.

ANALYTICAL MODEL AND RESULTS

The hypothesized model depicted in Figure 1 was tested using structural equation modeling techniques.[12] Using Lisrel 8 (Jöreskog and Sörbom 1993), we

[11] Pilot testing of the instrument indicated that CEOs had no difficulty in evaluating their hospital. The central funding authority groups hospitals by size and function. Thus, hospital CEOs were able to evaluate their hospital in relation to other hospitals of similar size and function. CEOs are reasonably well informed as to what is occurring elsewhere as the central funding authority routinely provides hospitals with data concerning other hospitals in their group. There is also a strong informal network among hospital CEOs.

[12] The model we tested was different from Figure 1 to the extent that it incorporated the two dimensions of organizational outcomes (efficiency and effectiveness) arising from the factor analysis (reported in the prior section).

TABLE 1
Descriptive Statistics and Correlation Matrix
(n = 56)

Variables	Actual Min/Max	Mean (Std. Dev.)	Pearson Correlation (significance levels) (1)	(2)	(3)	(4)	(5)
(1) Service Innovation	1/7	4.54 (1.51)	1.00				
(2) Structural Autonomy	4/28	17.98 (5.59)	0.26 (0.05)	1.00			
(3) RMP	2/14	9.27 (2.99)	0.37 (0.005)	0.74 (0.001)	1.00		
(4) CMP	5/35	21.98 (6.33)	0.12 (ns)	0.38 (0.004)	0.18 (ns)	1.00	
(5) Efficiency Outcomes	2/14	8.76 (2.52)	0.23 (0.08)	0.24 (0.07)	0.28 (0.03)	0.10 (ns)	1.00
(6) Effectiveness Outcomes	13/28	19.98 (3.75)	0.39 (0.003)	0.16 (ns)	0.03 (ns)	0.36 (0.007)	0.20 (ns)

estimated the parameters of our research model. The program provides estimates of the standardized path coefficients and associated standard errors. The program also provides numerous measures to determine the fit of the model to the sample data. We assessed the model using a series of nested models. This approach is widely accepted in the general management literature (see Anderson and Gerbing 1988; Medsker et al. 1994; Wayne et al. 1997). All models use the same set of variables as the hypothesized model. However, the nested models differ from the hypothesized model in that some paths are "constrained" and some paths are added or what is referred to as "unconstrained." A path is considered constrained when it is set equal to 0 in the model, while it is unconstrained when the parameters of the path are able to be estimated (i.e., not set to 0). The Chi-square differences between each nested model are computed and tested for significance. This test provides support for the importance or otherwise of particular paths to the fit of the overall model. For example, if a path is constrained in one model and compared to another model where this path is unconstrained and if the difference in the Chi-square is not significant, then the model with the constrained path is a better fit because it is more parsimonious (Anderson and Gerbing 1988).

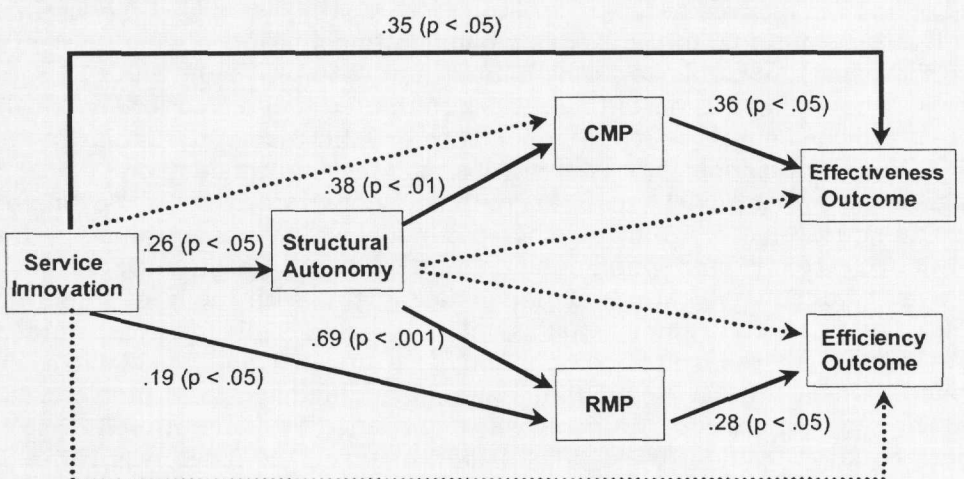
We tested our hypothesized relations commencing with the least constrained model.[13] The least constrained model is one that includes all of the paths noted in Figure 2. Our analysis involved comparison of the unconstrained model to a series of nested models through sequential Chi-square difference tests (not presented here). The sequence of nested models was determined by eliminating (i.e., setting the path equal to 0) the least significant parameter. If the difference in the Chi-square statistic was insignificant (taking into account the difference in the degrees of freedom), then the model with the constrained parameter was considered to be

[13] While there is some debate as to where to start the series of comparisons, the preferred method is to commence with the least constrained model (Anderson and Gerbing 1988). This approach also enabled an assessment of several alternative hypotheses.

more parsimonious. If the change in Chi-square was significant, then this would have suggested that the removed path was important and should not be constrained. We continued this process until no further improvements to the model could be made. At this point we had arrived at the most parsimonious model. The analysis of our data required a modification to our hypothesized model (depicted with solid lines in Figure 2). The significant path coefficients are noted in Figure 2. All of the measures normally employed to test the "fit" of structural equation models indicate that the modified model fits the data very well. The Chi-square value is insignificant (7.41, p = 0.59, df = 8). The goodness-of-fit-index (0.96) and the normed fit index (0.92) more than meet the cut-off criteria necessary for a good fit (0.90 and 0.80, respectively).

As illustrated in Figure 2, there is a positive and significant relation between service innovation and structural autonomy. The greater the rate of change in service offerings the greater the level of autonomy delegated to clinical units. Thus, H1 is supported. Hypothesis 2 was also supported. The level of autonomy granted to clinical units is positively related to the importance attached to both types of performance measures, although the relation is much stronger with measures of resource management than clinical management criteria. The results also support H3. Structural autonomy is an important intervening variable in the relation between service innovation and PMSs. Our assessment of the nested models indicates that constraining the paths between structure and either dimension of the PMS would significantly reduce the fit of the model. The importance of structure as an intervening variable in the relation between strategy and RMP criteria is further illustrated by examining the observed correlations among the variables (see Table 1) and the path coefficients linking service innovation and RMP criteria in Figure 2. Almost half of the observed relation between service innovation and RMP criteria (r = 0.37) is explained due to the indirect effect via structure (i.e., path coefficient after controlling for structure is 0.19).

FIGURE 2
Standardized Path Coefficients (significance levels) of Modified Model[a]



[a] The unconstrained path model includes all of the paths (dotted and solid). The solid lines form the modified model of best fit.

The findings indicate that there is a direct relation between strategic choice and use of RMP criteria. However, as predicted in H3, structural autonomy is an important intervening factor in this relation. Indeed, the relation between structure and use of RMPs is by far the strongest relation in the model. The evidence presented here indicates that there is no direct relation between service innovation and CMP criteria. The increased use of CMP measures arises solely due to the greater autonomy granted to clinical units in response to a higher rate of service innovation. The strength of the structure-PMS links relative to the strategy-PMS links for both PMS components is consistent with our hypothesis that it is accountability and not strategy that is the dominant imperative driving PMS design in this setting. The significant (but weaker) direct relation between an emphasis on service innovation and use of RMP measures is intuitively consistent with earlier studies that have identified the importance of financial controls to curb innovative excesses (Miller and Friesen 1982; Simons 1987).

Hypothesis 4 predicted that organizational outcomes would be enhanced when structure and PMSs were designed to complement strategic choice. Our results support this prediction. Support for H4 is evident in the fit statistics provided by the Lisrel model. These statistics indicate that the predicted relations between strategy, autonomy, PMS, and organizational outcome paths are critical to the fit of the model. In other words, organizational outcomes are enhanced when choices relating to autonomy and PMS design complement strategic choices.

There are several other relations worth noting. We did not expect there to be any difference in the relation between the two dimensions of the PMSs and organizational outcomes. However, our results suggest that the use of RMP measures positively influences the efficiency outcomes, while the use of CMP measures has a positive effect on the achievement of organizational effectiveness outcomes (i.e., those relating to patient care, teaching, and research). There was no significant relation between RMP criteria and the effectiveness outcomes or a relation between CMP criteria and the efficiency outcomes. There is also no relation between the two organizational outcomes of efficiency and effectiveness. Finally, it is interesting to note that there is a direct and positive relation between emphasis on service innovation and effectiveness outcomes, but no relation with the efficiency outcomes.

DISCUSSION AND CONCLUSIONS

This study developed a model to assess the interdependencies in the choices top management make when designing their organization. We were particularly interested in examining the interdependencies between service innovation, structural autonomy, and PMS design. Prior research studying the strategy/accounting control link has assumed that the choice of strategy influences only one element of organization design, namely the PMS. Models have been developed that posit that there is a direct relation between strategy and PMSs. As the results of empirical studies testing this link have been at best equivocal, we hypothesized that prior models were ignoring important interdependencies in organization design. We argued that the relation between strategy and PMSs is not necessarily a direct one but rather an indirect one that occurs via the nature of the structural arrangements.

Our results support our expectation concerning the importance of structure as a mediating variable between service innovation as a strategic priority and performance measurement systems. The findings suggest that strategic choice has a direct influence on top management's decision to grant autonomy to lower-level managers and that this, in turn, influences the importance attached to measures of performance that capture the scope of delegated authority. These findings

confirm earlier work in the general management literature concerning the relation between strategy and structure. The findings also support Abernethy and Lillis' (1995) conjecture, based on observations in the field, that getting the structure "right" has important implications for the design of PMSs.

It is also notable that the link between structure and PMSs was stronger in the context of resource management performance measures than clinical performance measures. This result is consistent with the emphasis in the public sector on financial accountability (Ezzamel and Willmott 1993; Lapsley 1999; Modell 2000). When structural adaptations occur that delegate decision making to physician managers for both outputs and inputs, the concern of top management is predominantly focused on accountability for resource management. It is assumed that clinical management criteria relating to quality and other nonfinancial outcomes will not be "at risk" to the same extent as financial outcomes. It is, therefore, not surprising that the link between increased autonomy and the importance superiors place on financial accountability measures is much stronger than the link with performance criteria relating to clinical management.

The findings of this study also develop further insights into the determinants of organizational outcomes. Our results indicate that structural autonomy is linked to organizational outcomes via two PMS design attributes. The use of performance measures that are focused on resource management influences efficiency or financial outcomes. In turn, the use of criteria that are focused on nonfinancial performance dimensions has a positive effect on effectiveness outcomes. These findings are intuitively appealing. In addition, they offer insight into the link between new PMSs and the effective management of public sector entities—a link that has been problematic with prior public sector PMS initiatives (Ittner and Larcker 1998). It would appear that PMSs signal what is desired in terms of overall organizational outcomes. Different signals influence different behaviors. The implementation of performance measures focused on resource management is likely to lead to behavior that focuses on efficiency goals but not on effectiveness goals. In the for-profit sector, the achievement of efficiency goals was traditionally viewed as synonymous with the achievement of effectiveness goals (Horngren et al. 1994). While this view has been questioned with the development of multidimensional performance scorecards deliberately capturing critical dimensions of both efficiency and effectiveness (Kaplan and Norton 1996), the two dimensions are still viewed as mutually reinforcing. However, in the nonprofit service sector, the achievement of efficiency goals is often unrelated to the achievement of organizational effectiveness outcomes that are difficult to quantify.

The results of this study indicate that the primary influence on the achievement of effectiveness goals is the use of "qualitative" performance measures. In the sample used here, effectiveness goals include quality outcomes relating to patient care, teaching, and research. While survival of these organizations requires the achievement of both financial and effectiveness outcomes, the findings indicate that these two outcome dimensions are unrelated. Furthermore, it would appear that in autonomous work-group settings, the achievement of both dimensions requires emphasis on the two elements of the organization's PMS.

These results also shed some light on the recent research in the management literature that has examined the efficacy of autonomous work groups (Sewell and Wilkinson 1992; Sewell 1998). This literature has been concerned with some of the adverse consequences associated with autonomous work groups and suggests that the control exercised by peers in this type of setting is more coercive than administrative controls imposed by management. There is some suggestion that these consequences can be mitigated through a combination of peer-based and

results-orientated accountability systems. While we did not explicitly examine peer control mechanisms, our results support the idea that autonomous work groups are more effective when appropriate accountability mechanisms are in place.

As with most empirical research, this study has a number of potential limitations. The theoretical model was examined in the hospital sector. These findings are, therefore, limited to the hospital sector and further research needs to be undertaken to assess these relations in other industries. The instrument used to measure performance measurement systems was purpose-developed for this study and, thus, requires further testing of its reliability and validity. Organizational outcomes were measured using self-ratings of CEOs. A major concern over the use of self-ratings in prior literature has been the problem of common-rater bias and the effect of this bias on the results. We tried to minimize the potential for common-rater bias by using two different sets of respondents. Concerns relating to leniency bias in self-ratings of performance are also unlikely to have influenced the results. While the data were somewhat skewed, there was a reasonable level of dispersion.

The model was an extension of prior models used to study the relation between strategy and control system design. However, only two elements of organization design were considered, namely structural autonomy and PMSs, and thus further research could be devoted to developing the model. For example, the model could be extended by examining the relation between the use of PMSs and alternative structural forms. We know very little about the design consequences for PMSs when individuals operate in teams within subunits or when organizations are reconfigured as networks with each node operating as a completely autonomous unit. The requirements for accountability in these settings will have important consequences for the design of PMSs. The model could be expanded to examine alternative means of increasing accountability in autonomous work groups. While a few studies have begun to explore the relative importance of PMSs *vis à vis* other accountability mechanisms, we know relatively little about the interdependencies associated with these alternative control mechanisms (Merchant 1985; Abernethy and Brownell 1999).

A potential limitation is also in the choice of method and analytical technique. The study employed a path model to examine the relations among the variables. Path models imply causality. It should be noted, however, that the path coefficients obtained from the analyses do not provide evidence of causal relations. These relations can only be derived from theory (Fisher 1946). Our results, therefore, can only be said to be consistent with the theoretical position taken. The validity of the results presented here could be tested using alternative research methods that enable causality to be established empirically.

Despite these potential limitations, the study adds to our general understanding of how different elements of organization design "fit" together. In particular, it provides some useful insights for top management in hospitals who are attempting to be responsive to market demands through service innovation. Our findings suggest that generating the range of efficiency and effectiveness outcomes critical in hospital settings requires organizational design adaptations that match a service innovation strategy. More specifically, it is suggested that improved outcomes are associated with both extensive delegation to autonomous work units and use of comprehensive PMSs that capture the outcomes of the range of autonomous decisions made within these work units. Neither the service innovation strategy nor the formation of autonomous work units will independently guarantee valued outcomes. The study highlights the importance of considering the interdependencies between strategic choice, structure, and PMS design.

APPENDIX
MEASUREMENT INSTRUMENTS

Service Innovation

The following two descriptions of hospitals were given to respondents. They were asked to circle on a seven-point Likert type scale where they would place their hospital ranging from 1 to 7, where 1 represented a Hospital A-type and 7 represented a Hospital B-type hospital.

Hospital A offers a relatively stable set of services and tends to focus on a particular segment (i.e., geographical region) of the population and offers a more limited range of services/programs than other hospitals of similar size and function. Generally, Hospital A is not at the forefront of new services or market developments in health care. Developments in services/programs tend to concentrate on current areas of operation. It believes that doing the best job possible in its existing range of services/programs and refining existing services/programs are of utmost importance.

Hospital B makes relatively frequent changes in, and additions to, its set of services/programs and tends to offer a wider range of medical services compared to other hospitals of similar size and function. Hospital B responds rapidly to early signals of market needs or opportunities and it consistently attempts to be at the forefront of new service/program developments. Other hospitals often follow Hospital B in the development of these services/programs. This type of hospital may not maintain its strength in all of the areas it enters.

Structural Autonomy

Respondents were asked to indicate the extent to which they agreed, on a scale ranging from 1 (strongly agree) to 7 (strongly disagree), with the following items relating to the autonomy of clinical units.

- Clinical units are responsible for costs incurred in their units.
- Clinical units are responsible for managing throughput in their units.
- Clinical units are now being treated as a business unit (a business unit is defined as one where the unit is responsible for both costs and revenues).
- We have developed contracts with our clinical unit managers that make them accountable for both costs and throughput targets.

Performance Measurement System

Respondents were asked to indicate the extent to which the following items were used to measure clinical unit managers' performance on a scale ranging from 1 to 7.

- Budget performance
- Throughput targets
- Quality of patient care
- Research output of the unit
- Adherence to standard procedures
- Cooperation with other units in the hospital
- Harmony of the unit

Organizational Outcomes

Respondents were asked to indicate their hospital's performance on a scale ranging from 1 (below average) to 7 (above average), on the following dimensions.

- Comparative costs with other hospitals
- Ability to win resources
- Reputation of medical programs
- Undergraduate and graduate medical/health professional teaching
- Research
- Quality of care

REFERENCES

Abernethy, M. A., and J. U. Stoelwinder. 1991. Budget use, task uncertainty, system goal orientation and subunit performance: A test of the "fit" hypothesis in not-for-profit hospitals. *Accounting, Organizations and Society* 16 (2): 105–120.

———, and A. M. Lillis. 1995. The impact of manufacturing flexibility on management control system design. *Accounting, Organizations and Society* 20 (May): 241–258.

———, and J. U. Stoelwinder. 1995. The role of professional control in the management of complex organizations. *Accounting, Organizations and Society* 20 (1): 1–17.

———, and W. F. Chua. 1996. A field study of control system "redesign": The impact of institutional processes on strategic choice. *Contemporary Accounting Research* 13 (Fall): 596–606.

———, and P. Brownell. 1999. The role of budgets in organizations facing strategic change: An exploratory study. *Accounting, Organizations and Society* 24 (3): 189–204.

Anderson, J. C., and D. W. Gerbing. 1988. Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin* 103 (May): 411–423.

Bazzoli, G. J., S. M. Shortell, N. Dubbs, C. Chan, and P. Kralovec. 1999. A taxonomy of health networks and systems: Bringing order out of chaos. *Health Services Research* 33 (6): 1683–1717.

Bouwens, J., and M. A. Abernethy. 2000. The consequences of customization on management accounting system design. *Accounting, Organizations and Society* 25 (3): 221–241.

Bromwich, M., and I. Lapsley. 1997. Decentralization and management accounting in central government: Recycling old ideas? *Financial Accountability and Management* 13 (2): 181–201.

Burns, L. R., R. M. Anderson, and S. M. Shortell. 1993. Trends in hospital/physician relationships. *Health Affairs* (Fall): 213–223.

Burns, T., and G. M. Stalker. 1961. *The Management of Innovation.* London: Tavistock.

Campbell, J. P. 1979. On the nature of organizational effectiveness. In *New Perspectives on Organizational Effectiveness*, edited by P. S. Goodman, and J. M. Pennings. San Francisco, CA: Jossey-Bass.

Chapman, C. S. 1997. Reflections on a contingent view of accounting. *Accounting, Organizations and Society* 22 (2): 189–205.

Chow, C. W., D. Ganulin, K. Haddad, and J. Williamson. 1998. The balanced scorecard: A potent tool for energizing and focusing healthcare organization management. *Journal of Healthcare Management* 43 (3): 263–280.

Cohen, S. G., and G. E. Ledford. 1994. The effectiveness of self-managing teams: A quasi-experiment. *Human Relations* 47 (1): 13–43.

Cronbach, L. J. 1951. Coefficient alpha and the internal structure of tests. *Psychometrika* 16: 297–334.

Daft, R. L., and R. H. Lengel. 1986. Organizational information requirements, media richness and structural design. *Management Science* 32 (5): 554–571.

Daniel, S. J., and W. D. Reitsperger. 1991. Linking quality strategy with management control systems: Empirical evidence from Japanese industry. *Accounting, Organizations and Society* 16: 601–618.

Davis, K. 1999. International health policy: Common problems, alternative strategies. *Health Affairs* 18 (3): 135–143.

Dean, J. W., S. J. Yoon, and G. I. Susman. 1992. Advanced manufacturing technology and organization structure: Empowerment or subordination? *Organization Science* 3 (2): 203–229.

Dixon, J. R., A. J. Nanni, and T. E. Vollman. 1990. *The New Performance Challenge: Measuring Operations for World-Class Competition.* Homewood, IL: Dow Jones-Irwin.

Doty, D. H., W. H. Glick, and G. P. Huber. 1993. Fit, equifinality and organizational effectiveness: A test of two configurational theories. *Academy of Management Journal* 36 (December): 1196–1250.

———, and C. Hardy. 1996. Sustained product innovation in large, mature organizations: Overcoming innovation-to-organization problems. *Academy of Management Journal* 39 (5): 1120–1153.

Duggan, J. M. 1994. Quality of care under casemix. *The Medical Journal of Australia* 161 (supplement): S18–S20.

Evans, J. H. 1998. Cost management and management control in health care organizations: Research opportunities. *Behavioral Research in Accounting* 10: 78–93.

Ezzamel, M., and H. Willmott. 1993. Corporate governance and financial accountability: Recent reforms in the UK public sector. *Accounting, Auditing & Accountability Journal* 6 (3): 109–132.

Fisher, J. G. 1998. Contingency theory, management control systems and firm outcomes: Past results and future directions. *Behavioral Research in Accounting* 10 (Supplement): 47–64.

Fisher, R. A. 1946. *Statistical Methods for Research Workers.* Tenth edition. Edinburgh, Scotland: Oliver and Boyd.

Flamholtz, E. G., T. K. Das, and A. S. Tsui. 1985. Toward and integrative framework of organizational control. *Accounting, Organizations and Society* 10 (1): 35–50.

Forgione, D. A. 1997. Health care financial and quality measures: International calls for a "balanced scorecard" approach. *Journal of Health Care Finance* 24 (1): 55–58.

Freidson, E. 1975. *Doctoring Together: A Study of Professional Social Control.* Chicago, IL: University of Chicago Press.

Galbraith J. R. 1977. *Organization Designs.* Reading, MA: Addison-Wesley.

Goodman, P. S., and J. M. Pennings. 1979. *New Perspectives on Organizational Effectiveness.* San Francisco, CA: Jossey-Bass.

Gordon, L. A., and V. K. Narayanan. 1984. Management accounting systems, perceived environmental uncertainty and organization structure: An empirical investigation. *Accounting, Organizations and Society* 9 (1): 33–47.

Govindarajan, V. 1988. A contingency approach to strategy implementation at the business-unit level: Integrating administrative mechanisms with strategy. *Academy of Management Journal* 31 (4): 828–853.

Groot, T. 1999. Budgetary reforms in the non-profit sector: A comparative analysis of experiences in health care and higher education in the Netherlands. *Financial Accountability & Management* 15 (3/4): 353–376.

Gupta, A., I. J. Chen, and D. Chiang. 1997. Determining organizational structure choices in advanced manufacturing technology management. *Omega International Journal of Management Science* 25 (5): 511–521.

Habib, M. M., and B. Victor. 1991. Strategy, structure, and performance of U.S. manufacturing and service MNCs: A comparative analysis. *Strategic Management Journal* 12: 589–606.

Hambrick, D. C. 1983. Some tests of the effectiveness and functional attributes of Miles and Snow's strategic types. *Academy of Management Journal* 26 (March): 5–26.

Hanson, R., and J. O'Dea. 1994. The casemix conundrum—Trick or treat? *The Medical Journal of Australia* 161 (Supplement): S2–S3.

Harper, D. L. 1985. Critical appraisal of the DRG system. *Australian Health Review* 8 (1): 14–22.

Hartmann, F. G. H. 2000. The appropriateness of RAPM: Toward the further development of theory. *Accounting, Organizations and Society* 25 (4/5): 451–482.

Henderson, J. 1989. *The Globalization of High Technology Production: Society, Space and Semi-Conductors in the Restructuring of the Modern World.* New York, NY: Routledge.

Hopwood, A. G. 1976. *Accounting and Human Behavior.* Englewood Cliffs, NJ: Prentice Hall.

Horngren, C. T., G. Foster, and S. M. Datar. 1994. *Cost Accounting: A Managerial Emphasis.* Englewood Cliffs, NJ: Prentice Hall.

Ittner, C. D., and D. F. Larcker. 1995. Total quality management and the choice of information and reward systems. *Journal of Accounting Research* 33: 1–34.

———, and ———. 1997. Quality strategy, strategic control systems, and organizational performance. *Accounting, Organizations and Society* 22 (3/4): 293–314.

———, and ———. 1998. Are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction. *Journal of Accounting Research* 36: 1–35.

Jones, C. S., and I. P. Dewing. 1997. The attitudes of NHS clinicians and medical managers towards changes in accounting controls. *Financial Accountability & Management* 13 (3): 261–280.

———. 1999. Developing financial accountability in British acute hospitals. *Financial Accountability and Management* 15 (1): 1–20.

Jonsson, S., and R. Solli. 1993. "Accounting talk" in a caring setting. *Management Accounting Research* 4 (4): 301–321.

Jöreskog, K. G., and D. Sörbom. 1993. *Lisrel 8: Structural Equation Modeling with the SIMPLIS Command Language.* Hillsdale, NJ: Lawrence Erlbaum.

Kaplan, R. S., and D. P. Norton. 1996. *The Balanced Scorecard: Translating Strategy Into Action.* Boston, MA: Harvard Business School Press.

———, and A. A. Atkinson. 1998. *Advanced Management Accounting.* Upper Saddle River, NJ: Prentice Hall.

———, and D. P. Norton. 2001. *The Strategy-Focused Organization: How Balanced Scorecard Companies Thrive in the New Business Environment.* Boston, MA: Harvard Business School Publishing Corporation.

Kren, L. 1997. *The Role of Accounting Information in Organizational Control.* New York, NY: John Wiley & Sons.

Lapsley, I. 1994. Responsibility accounting revived? Market reforms and budgetary control in health care. *Management Accounting Research* 5 (3/4): 337–352.

———. 1999. Accounting and the new public management: Instruments of substantive efficiency or a rationalizing modernity? *Financial Accountability and Management* 15 (3/4): 201–207.

Lawler, E. E. 1993. Creating the high-involvement organization. In *Organizing for the Future*, edited by J. R. Galbraith, and E. E. Lawler, 172–193. San Francisco, CA: Jossey-Bass.

Lawrence, P. R., and J. W. Lorsch. 1967. *Organization and Environment.* Boston, MA: Harvard Business School.

Le Grand, J. 1999. Competition, cooperation, or control? Tales from the British National Health Service. *Health Affairs* 18 (3): 27–39.

Lee, H., L. M. Delene, M. A. Bunda, and C. Kim. 2000. Methods of measuring health-care service quality. *Journal of Business Research* 48 (3): 233–246.

Lee, S. Y. D., and J. A. Alexander. 1998. Using CEO succession to integrate acquired organizations: A contingency analysis. *British Journal of Management* 9 (3): 181–197.

Lei, D., M. A. Hitt, and J. D. Goldhar. 1996. Advanced manufacturing technology: Organizational design and strategic flexibility. *Organization Studies* 17 (3): 501–524.

Lipe, M. G., and S. E. Salterio. 2000. The balanced scorecard: Judgmental effects of common and unique performance measures. *The Accounting Review* 75 (3): 283–299.

———, and ———. 2001. A note on the judgmental effects of the balanced scorecard's information organization. Working paper, University of Oklahoma.

March, J. G., and H. A. Simon. 1958. *Organizations.* New York, NY: John Wiley.

Medsker, G. J., L. J. Williams, and P. J. Holahan. 1994. A review of current practices for evaluating causal models in organizational behavior and human resources management research. *Journal of Management*: 439–464.

Mensah, Y. M. 2000. Accounting issues in health care. *Journal of Accounting and Public Policy* 19 (1): 3–7.

Merchant, K. A. 1985. Organizational control and discretionary program decision making: A field study. *Accounting, Organizations and Society* 10 (1): 67–85.

———. 1998. *Modern Management Control Systems: Text and Cases.* Upper Saddle River, NJ: Prentice Hall.

Miles, M. P., J. G. Covin, and M. B. Heeley. 2000. The relationship between environmental dynamism and small firm structure, strategy, and performance. *Journal of Marketing Theory and Practice* 8 (2): 63–78.

Miles, R. E., and C. C. Snow. 1978. *Organizational Strategy, Structure and Process.* New York, NY: McGraw-Hill.

———, and ———. 1992. Causes of failure in network organizations. *California Management Review* 34 (4): 53–72.

Milgrom, P., and J. Roberts. 1995. Complementarities and fit: Strategy, structure and organizational change in manufacturing. *Journal of Accounting and Economics* 19 (March-May): 179–208.

Miller, D., and P. H. Freisen. 1982. Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal* 3 (1): 1–25.

———. 1987. The structural and environmental correlates of business strategy. *Strategic Management Journal* 8 (1): 55–76.

Modell, S. 2000. Integrating management control and human resource management in public health care: Swedish case study evidence. *Financial Accountability and Management* 16 (1): 33–53.

Molinari, C., L. Morlock, J. A. Alexander, and C. A. Lyles. 1993. Hospital board effectiveness: Relationships between governing board composition and hospital financial viability. *Health Services Research* 28 (3): 357–378.

Mouritsen, J., and A. Bekke. 1997. Continuity and discontinuity in accounting technology in Danish institutions. *Financial Accountability and Management* 13 (2): 165–180.

Naman, J. L., and D. P. Slevin. 1993. Entrepreneurship and the concept of fit: A model and empirical tests. *Strategic Management Journal* 14 (2): 137–153.

Nanni, A. J., J. R. Dixon, and T. E. Vollman. 1992. Integrated performance measurement: Management accounting to support the new manufacturing realities. *Journal of Management Accounting Research* 4 (Fall): 1–19.

Noy, S., and R. Lachman. 1993. Physician-hospital conflict among salaried physicians. *Health Care Management Review* 18 (Fall): 60–69.

Otley, D. T., and A. Fakiolas. 2000. Reliance on accounting performance measures: Dead end or new beginning? *Accounting, Organizations and Society* 25 (4/5): 497–510.

Ouchi, W. G. 1977. The relationship between organizational structure and organizational control. *Administrative Science Quarterly* 22 (1): 95–113.

Pennings, J. M. 1975. The relevance of the structural-contingency model for organizational effectiveness. *Administrative Science Quarterly* 20 (3): 393–410.

Preston, A. M., D. J. Cooper, and, R. Coombs. 1992. Fabricating budgets: A study of the production of management budgeting in the National Health Service. *Accounting, Organizations and Society*: 561–593.

Rotch, W. 1993. Management control systems: One view of components and their interdependence. *British Journal of Management* 4 (September): 191–203.

Scott, T. W., and P. Tiessen. 1999. Performance measurement and managerial teams. *Accounting, Organizations and Society* 24 (3): 263–285.

Scott, W. R. 1993. The organization of medical care services: Towards an integrated theoretical model. *Medical Care Review*: 271–303.

Sewell, G., and B. Wilkinson. 1992. "Someone to watch over me": Surveillance, discipline and the just-in-time labor process. *Sociology* 26 (2): 271–289.

———. 1998. The discipline of teams: The control of team-based industrial work through electronic and peer surveillance. *Administrative Science Quarterly* 43 (2): 397–428.

Shortell, S. M., and E. J. Zajac. 1990. Perceptual and archival measures of Miles and Snow's strategic types: A comprehensive assessment of reliability and validity. *Academy of Management Journal* 33 (December): 817–832.

———, R. R. Gillies, D. A. Anderson, K. M. Erickson, and J. B. Mitchell. 1996. *Remaking Heath Care in America: Building Organized Delivery Systems*. San Francisco, CA: Jossey Bass.

Simons, R. 1987. Accounting control systems and business strategy: An empirical analysis. *Accounting, Organizations and Society* 12 (4): 357–374.

———. 1995. *Levers of Control: How Managers Use Innovative Control Systems to Drive Strategic Renewal*. Boston, MA: Harvard Business School Press.

Slater, S. F., and E. M. Olson. 2000. Strategy type and performance: The influence of sales force management. *Strategic Management Journal* 21: 813–829.

Smith, P. 1993. Outcome-related performance indicators and organizational control in the public sector. *British Journal of Management* 4 (3): 135–151.

Smith, S., S. Heffler, M. Freeland, and The National Health Expenditures Projection Team. 1999. The next decade of health spending: A new outlook. *Health Affairs* 18 (4): 86–95.

Snow, C. C., and L. G. Hrebiniak. 1980. Strategy, distinctive competence and organizational performance. *Administrative Science Quarterly* 25 (June): 317–336.

Solomons, D. 1965. *Divisional Performance: Measurement and Control.* Homewood, IL: Irwin.

Steers, R. M. 1977. *Organizational Effectiveness: A Behavioral View.* Santa Monica, CA: Goodyear.

Tuohy, C. H. 1999. Dynamics of a changing health sphere: The United States, Britain, and Canada. *Health Affairs* 18 (3): 114–134.

Vancil, R. F., and L. E. Buddrus. 1979. *Decentralization: Managerial Ambiguity by Design.* Homewood, IL: Dow Jones-Irwin.

Victorian Department of Health and Community Services. 1993. *Casemix Funding for Public Hospitals: Victoria's Policy.* Melbourne, Victoria. Acute Health Services Division.

Watkins, A. L. 2000. Hospital financial ratio classification patterns revisited: Upon considering nonfinancial information. *Journal of Accounting and Public Policy* 19 (1): 73–95.

Wayne, S. J., L. M. Shore, and R. C. Linden. 1997. Perceived organizational support and leader-member exchange: A social exchange perspective. *Academy of Management Journal* 40 (February): 82–111.

Weiner, S. L., J. H. Maxwell, H. M. Sapolsky, D. L. Dunn, and W. C. Hsiao. 1987. Economic incentives and organizational realities: Managing hospitals under DRGs. *Milbank Memorial Fund Quarterly* 65 (4): 463–487.

Wood, J. J., and S. E. Thomas. 1985. DRGs from the hospital administrator's point of view. *Australian Health Review*: 126–131.

Young, D., and R. Saltman. 1985. *The Hospital Power Equilibrium—Physician, Behavior and Cost Control.* Baltimore, MD: John Hopkins University Press.

Zimmerman, J. 1997. *Accounting for Decision Making and Control.* Boston, MA: Irwin/McGraw-Hill.