

# Assessing empirical research in managerial accounting: A value-based management perspective<sup>☆</sup>

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## Abstract

This paper applies a value-based management framework to critically review empirical research in managerial accounting. This framework enables us to place the exceptionally diverse set of managerial accounting studies from the past several decades into an integrated structure. Our synthesis highlights the many consistent results in prior research, identifies remaining gaps and inconsistencies, discusses common methodological and econometric problems, and suggests fruitful avenues for future managerial accounting research.

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## **1. Introduction**

The past two decades have witnessed considerable change in managerial accounting practice. From its traditional emphasis on financially-oriented decision analysis and budgetary control, managerial accounting has evolved to encompass a more strategic approach that emphasizes the identification, measurement, and management of the key financial and operational drivers of shareholder value (International Federation of Accountants, 1998; Institute of Management Accountants, 1999). A similar evolution has occurred in managerial accounting research. Empirical studies of budgeting and financial control practices are giving way to research on a variety of “new” techniques such as activity-based costing, the balanced scorecard, strategic accounting and control systems, and economic value performance measures.

Although researchers generally treat these techniques as distinct, companies increasingly are integrating these various practices using a comprehensive “value-based management” (hereafter VBM) framework. This approach focuses on (1) defining and implementing strategies that provide the highest potential for shareholder value creation; (2) implementing information systems focused on value creation and the underlying “drivers” of value across a company’s business units, products, and customer segments; (3) aligning management processes, such as business planning and resource allocation, with value creation; and (4) designing performance measurement systems and incentive compensation plans that reflect value creation (KPMG Consulting, 1999; PricewaterhouseCoopers, 1999).

This paper applies a value-based management framework to critically review empirical research in managerial accounting. Given the breadth of managerial accounting research methods and topics, it is impossible for a single paper to adequately summarize the entire field. Instead, we limit our review to organization-level studies that use archival or survey data to examine issues related to the VBM perspective. These criteria lead us to exclude most behavioral research, experimental studies, and qualitative case research. We also exclude much of the compensation literature, which is covered in comprehensive review papers by Pavlik et al. (1993), Murphy (1998), and Bushman and Smith (this issue), among others.

We adopt the VBM framework for three reasons.<sup>1</sup> First, VBM represents an extension of traditional management planning and control frameworks (e.g., Anthony, 1965) and contingency theories of managerial accounting system design (e.g., Gordon and Miller, 1976; Hayes, 1977; Waterhouse and Tiessen, 1978; Otley, 1980), and is consistent with economic models of managerial accounting practices. This evolutionary link allows us to apply evidence from several decades of research to the study of contemporary practices. Second, the VBM perspective explicitly incorporates a wide variety of recent “innovations” in managerial accounting practice, such as activity-based costing and the balanced scorecard, that are ignored in many managerial accounting frameworks. Third, analytical and empirical research in managerial accounting tends to be motivated by changes in practice. By focusing on an emerging trend in managerial accounting (KPMG Consulting, 1999; PricewaterhouseCoopers, 1999), we attempt to

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<sup>1</sup> The value-based management framework used in this paper is an adaptation of similar frameworks developed by a number of accounting and consulting firms. For discussions of the value-based management frameworks developed by Deloitte & Touche, McKinsey & Co., KPMG Peat Marwick, and

provide insight into the applicability and benefits of the normative VBM framework, and to identify fruitful avenues for future research.

The remainder of the paper is organized into five sections. Section 2 outlines the simple value-based management framework used to guide our review, and discusses the framework's links to other conceptual models and economic theories in the managerial accounting literature. Section 3 offers our overall assessment of empirical research in managerial accounting. Section 4 critically reviews studies relating to each step in the value-based management process and identifies potential research topics. Section 5 discusses our views on the steps needed to advance empirical managerial accounting research in the future. Concluding remarks are provided in Section 6.

## **2. Overview of the Value-Based Management Approach**

### *2.1 The Evolution in Managerial Accounting Practices*

The value-based management approach represents an extension of more than four decades of managerial accounting research and practice. According to the International Federation of Accountants (1998), the recent emphasis on value-based management is the fourth evolutionary step in managerial accounting. Prior to 1950, the primary focus of managerial accounting practice was cost determination and financial control, through the use of budgeting and cost accounting systems. By the mid-1960s, this focus shifted to the provision of information for management planning and control. This second stage was epitomized by Anthony's (1965) management control framework. Anthony described management control as the process for ensuring that resources are obtained and used effectively and efficiently to achieve the organization's objectives. His framework

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PricewaterhouseCoopers, see Dixon and Hedley (1997), Copeland et al. (1996); KPMG Consulting (1999), and Black et al. (1998), respectively.



clearly distinguished management control from strategic planning and operational control, thereby limiting the scope of managerial accounting responsibilities and focusing primary attention on accounting information (Langfield-Smith, 1997; Otley, 1999).

Contingency theories expanded the management planning and control framework by articulating some of the contextual or “contingent” factors influencing the entire organizational control “package” of accounting and non-accounting information systems, organizational design, and other control mechanisms (e.g., Gordon and Miller, 1976; Hayes, 1977; Waterhouse and Tiessen, 1978; Otley, 1980). These theories contend that there is no universally applicable system of management accounting and control--the choice of appropriate accounting and control techniques depends upon the circumstances surrounding an organization. Among the prominent contingent factors in this literature are the external environment (e.g., simple vs. complex; static vs. dynamic), technology (e.g., job shop to mass production; production interdependencies; automation), competitive strategy and mission (e.g., low cost vs. innovation), business unit and industry characteristics (e.g., size, diversification, firm structure, regulation), and knowledge and observability factors (e.g., knowledge of the transformation process; outcome observability; behavior observability) (Fisher, 1995).

Beginning in the mid-1980s, managerial accounting began shifting away from a strict focus on planning and control to emphasize the reduction of waste in business processes. This shift was prompted by the growing adoption of quality management programs, as well as the introduction of accounting techniques such as cost of quality measurement, activity-based costing, process value analysis, and strategic cost management (e.g., Cooper and Kaplan, 1991; Shank and Govindarajan, 1994).

By the mid-1990s, managerial accounting entered its fourth stage, with the focus on planning and control and waste reduction expanding to encompass a more strategic emphasis on the creation of firm value through the identification, measurement, and management of the drivers of customer value, organizational innovation, and shareholder returns. A hallmark of this era is the introduction of a diverse set of “new” managerial accounting techniques focused on promoting value creation. These techniques include the development of balanced scorecards of leading and lagging indicators of economic success (e.g., Kaplan and Norton, 1996), economic value measures that are claimed to approximate shareholder returns (e.g., Stewart, 1991), and strategic management accounting systems that provide information concerning the current and expected states of strategic uncertainties (e.g., Bromwich, 1990; Simons, 1991).

## *2.2 The Value-Based Management Framework*

The value-based management approach builds on the preceding practices to provide an integrated framework for measuring and managing businesses, with the explicit objective of creating superior long-term value for shareholders (Dixon and Hedley, 1993; Copeland et al., 1996; KPMG Consulting, 1999; Black et al., 1998). Although VBM frameworks vary somewhat from firm to firm, they generally include six basic steps. As shown in Figure 1, these steps include:

1. Choosing specific internal objectives that lead to shareholder value enhancement.
2. Selecting strategies and organizational designs consistent with the achievement of the chosen objectives.
3. Identifying the specific performance variables, or “value drivers,” that actually create value in the business given the organization’s strategies and organizational design.
4. Developing action plans, selecting performance measures, and setting targets based on the priorities identified in the value driver analysis.

5. Evaluating the success of action plans and conducting organizational and managerial performance evaluations.
6. Assessing the ongoing validity of the organization's internal objectives, strategies, plans, and control systems in light of current results, and modifying them as required.

\*\*\* Figure 1 about here \*\*\*

The simple sequential VBM framework (like all organizational design frameworks) is an abstraction of the complex interdependencies, simultaneous choices, and feedback loops found in practice. However, it provides a useful mechanism for categorizing empirical studies in managerial accounting (which typically assume a similar sequential process) and for assessing the extent to which this research supports the associations discussed in the normative VBM literature. More importantly, the framework captures many of the linkages highlighted in contingency theories, principal-agent models (see Baiman [1990] and Lambert [this issue] for reviews), and economics-based organizational design frameworks (e.g., Brickley et al., 1997a; Milgrom and Roberts, 1992; Jensen, 1998). Figures 2 and 3, for example, illustrate representative economic and contingency frameworks developed by Brickley et al. (1995) and Otley (1980), respectively. Although the specific terminology and placement of variables vary somewhat, each framework suggests that managerial accounting and control should be viewed as a complete organizational control package consisting of accounting information systems, performance measurement and reward systems, and organizational design, with the choice and performance consequences of these practices a function of the firm's external environment, organizational objectives, and strategies. The VBM framework extends these ideas to highlight the identification of the firm's financial and

non-financial value drivers, and the feedback loop from performance to the subsequent reassessment of objectives, strategies, and organizational design and control.

\*\*\* Figures 2 and 3 about here \*\*\*

### **3. General Observations on Empirical Research in Managerial Accounting**

In reviewing the studies for this paper, a number of notable features struck our attention, including the practice-oriented nature of this research, the extent to which the studies' topics correspond to the latest management fads, and the diversity in samples, research methods, and theories used by researchers.

Perhaps the most striking feature is the extent to which the research is driven by changes in practice (albeit with some lag). The focus on emerging trends offers advantages and disadvantages. On the one hand, it produces a diverse set of interesting papers that are better aligned with the interests of practitioners and the material covered in most contemporary managerial accounting textbooks. In our view, this alignment is desirable, and has helped overcome some of the criticisms in the 1980s and early 1990s that managerial accounting research had become irrelevant and no longer reflected the concerns of managers.

On the other hand, it has produced a faddish nature to the managerial accounting literature. Many papers are motivated purely by the fact that a certain topic has received considerable attention in the business press, with little effort to place the practice or study within some broader theoretical context. An example is early cost driver studies, which were motivated by claims in practitioner-oriented activity-based costing and operations

management articles, rather than economic, operations research, or behavioral theories (see Dopuch [1993] for a critique of cost driver studies).

Research topics also tend to disappear as the next big managerial accounting “innovation” appears, even though earlier “hot” topics may not have been fully explored. An excellent example is research at the interface of accounting and operations management. Beginning with Kaplan’s (1983) call for greater emphasis on manufacturing performance measurement, considerable enthusiasm for research on this topic emerged in the managerial accounting community. Two research conferences sponsored by Harvard Business School resulted in widely cited books containing papers by leading researchers from North America and Europe (Bruns and Kaplan, 1987; Kaplan, 1990). Journals such as *Accounting, Organizations and Society*, *The Accounting Review*, *Journal of Accounting and Economics*, and *Journal of Accounting Research* published papers on manufacturing performance measurement, incentives in advanced manufacturing environments, and production economics. Yet, despite the initial enthusiasm, the advent of “new” topics such as the balanced scorecard, intangible assets, and economic value added has substantially reduced research at the interface of accounting and operations management.<sup>2</sup> Instead, we are left with an underdeveloped body of research that fails to build on prior studies to increase our understanding of the

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<sup>2</sup> Brickley et al. (1997b) document a similar pattern of interest in “innovative” management techniques in the business press. For example, interest in just-in-time manufacturing peaked in the late 1980s, while interest in total quality management began to wane in the early 1990s. In their place, press coverage began emphasizing activity-based costing and reengineering. By 1997, interest in these two topics also began to decline, this time in favor of articles on economic value added. The declining interest in advanced manufacturing practices in the business press is likely to explain much of the topic’s declining interest in the managerial accounting community. Another factor may be greater access to funding and research sites when research topics are perceived to be new or innovative.

topic, leaves many important research topics unexplored<sup>3</sup>, and lacks the critical mass of related studies needed to reconcile conflicting results or to reach consensus on the performance benefits from various manufacturing performance measurement practices.<sup>4</sup>

One factor making it difficult to generalize results from managerial accounting studies is the diversity in samples, research methods, and theories used by researchers. This diversity has a number of causes. One of the primary causes is differences in the theoretical disciplines used to motivate managerial accounting studies. Unlike capital markets research, which is based almost exclusively on financial economics theories, managerial accounting research draws from a wide variety of disciplines, including economics, psychology, sociology, and operations research.<sup>5</sup> This variety is due in part to the fact that much of the empirical research in managerial accounting is conducted outside of North America. While North American universities tend to emphasize economics in their doctoral programs and research, many universities in other parts of the world place greater emphasis on behavioral disciplines such as organizational behavior and sociology. This behavioral focus is reflected in our citations, with significantly more references from the behaviorally-oriented European journal *Accounting, Organizations, and Society* than from leading economics-oriented North American journals.

Another factor contributing to the diversity in managerial accounting research is the lack of publicly-available data. Whereas financial accounting and executive

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<sup>3</sup> Young and Selto's (1991) review of the advanced manufacturing literature identified a variety of research topics for accounting researchers. A number of these, such as cost of quality measurement and life cycle costing, have received virtually no attention in leading accounting journals.

<sup>4</sup> Perhaps the only managerial accounting topics that have received enough attention to perform true meta-analyses of results are executive compensation and participative budgeting, neither of which is covered in any detail in this review. See Greenberg et al. (1994) for a meta-analysis of the participative budgeting literature.

<sup>5</sup> See Shields (1997) for an analysis of the theoretical bases used in managerial accounting research during the 1990s.

compensation researchers can obtain data from financial statements, firm disclosures, and data bases such as Compustat, CRSP, Execucomp, and I/B/E/S, public information on managerial accounting practices or adoption dates is rarely available. Instead, researchers must conduct surveys using instruments that tend to vary somewhat from study to study, obtain data from third parties such as consulting firms, or gather company-specific archival data from research sites. The broad set of data sources allows managerial accounting studies to avoid the narrow focus that sometimes occurs when researchers are constrained by the availability of public data (e.g., the over-emphasis on executives in compensation studies due to proxy disclosure requirements). However, the heterogeneity in samples makes it difficult to compare findings, build on prior studies, or assess the generalizability of the results.

We conduct our review against this background. In the following sections, we attempt to categorize and summarize the diverse set of managerial accounting studies. We follow this appraisal with our views on the steps required to advance empirical research in managerial accounting as we go forward.

#### **4. Review of Empirical Research**

Our review is organized using the six value-based management steps in Figure 1. For each step in the framework, we critically evaluate related empirical studies, identify common limitations, and offer suggestions for future research.

##### *4.1 The Choice of Organizational Objectives*

A primary assumption in managerial accounting research is that the ultimate goal of managerial accounting systems is providing the information and control mechanisms needed to achieve organizational objectives. However, the choice of *specific*



organizational objectives traditionally has been outside the scope of managerial accounting research. This has changed with the advent of value-based management approaches. In this section, we discuss these changes and assess research on the choice of objectives in value-based management programs. We then provide a broader perspective on research opportunities related to the choice and performance consequences of organizational objectives.

#### *4.1.1 Research on Value-Based Organizational Objectives*

Many VBM advocates contend that an organization's primary objectives must be stated in terms of "economic value" measures, such as economic value added (EVA) and cash flow return on investment (CFROI), in order to align internal goals with the maximization of shareholder value (e.g., Copeland et al., 1996; Stern et al. 1995; KPMG Consulting, 1999).<sup>6</sup> This contention is based on assertions that changes in economic value measures track changes in shareholder wealth more closely than traditional accounting measures, and should therefore replace accounting measures for goal setting, capital budgeting, and compensation purposes (Stern et al., 1995). Claims that economic value measures are superior to traditional accounting measures are not limited to consultants and the business press. Analytical studies by Anctil (1996), Rogerson (1997),

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<sup>6</sup> The foundations for these "new" economic value measures are residual income and internal rate of return concepts developed in the 1950s and 1960s. Stern Stewart & Co.'s trademarked "Economic Value Added" or EVA<sup>®</sup> measure, for example, is the firm's proprietary adaptation of residual income. EVA is defined as adjusted operating income minus a capital charge. Common adjustments to compute EVA include modifications to the deferred income tax reserve, the LIFO reserve, the treatment of intangible assets such as research and development and advertising, and goodwill amortization. CFROI is similar to the long-term internal rate of return, calculated by dividing inflation-adjusted cash flow by the inflation-adjusted cash investment.

Reichelstein (1997), and others show how the use of residual income-based measures such as EVA can ensure goal congruence between the principal and agent.<sup>7</sup>

Much of the support for the claimed superiority of economic value measures is based on relatively unsophisticated studies examining the relation between market measures (e.g., market value or shareholder returns) and EVA. Simple univariate tests by Milunovich and Tseui (1996) and Lehn and Makhija (1997) find market-value added more highly associated with EVA than with accounting returns, earnings per share, earnings per share growth, return on equity, free cash flow, or free cash growth. O'Byrne (1996) uses regression models to examine the association between market value and two performance measures: EVA and net operating profit after tax (NOPAT). Both measures have similar explanatory power when no control variables are included in the regression models, but a modified EVA model has greater explanatory power when industry indicator variables and the logarithm of capital for each firm are included as additional explanatory variables. However, O'Byrne (1996) does not make similar adjustments to the NOPAT model, making it impossible to compare results using the different measures.

More sophisticated analyses are less conclusive. Chen and Dodd (1997) examine the explanatory power of accounting measures (earnings per share, return on assets, and return on equity), residual income, and various EVA-related measures. Although the EVA measures outperform accounting earnings in explaining stock returns, the earnings measures provide significant incremental explanatory power above EVA. The authors also find the explanatory power of the EVA measures far lower than claimed by proponents.

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<sup>7</sup> See Bromwich and Walker (1998) for a review of theoretical papers on the strengths and weaknesses of value-based management approaches based on residual income measures such as EVA.

Biddle et al. (1997) use contemporary capital markets research techniques to examine the power of accounting measures (earnings and operating profits) to explain stock market returns relative to EVA and five components of EVA (cash flow from operations, operating accruals, after-tax interest expense, capital charge, and accounting adjustments). In contrast to less sophisticated studies, Biddle et al. (1997) find that traditional accounting measures generally outperform EVA in explaining stock prices. While the EVA measure's capital charges and adjustments for accounting "distortions" have some incremental explanatory power over traditional accounting measures, the contribution from these variables is not economically significant in their tests.

Even if economic value measures have a stronger statistical relation with stock returns, it is not clear that these measures are preferable for management planning and control purposes. Analytical research by Gjesdal (1981) and Paul (1992) shows that an information system that is useful for valuing the firm need not be useful in assessing a manager's performance, making the correlation between a performance measure and stock returns irrelevant when choosing objectives. Similarly, Zimmerman (1997) discusses how *divisional* EVA measures may be highly misleading indicators of value creation and may provide the wrong incentives, even if *corporate* EVA closely tracks changes in stock price. Garvey and Milbourn (2000), on the other hand, develop a model showing that the correlation between EVA and stock returns is a relevant factor in the choice of performance measures. They empirically test this model by examining whether the adoption of EVA for compensation purposes is positively related to the statistical association between the firm's economic value added and stock returns. Their results support this hypothesis, leading the authors to conclude that the correlation between

performance measures and stock returns is a useful input into the choice of internal objectives.

The mixed results in these studies raise an important question: Do organizations using economic value measures as their primary objectives for planning and control purposes achieve superior performance? Again, the evidence is mixed. Wallace (1997) examines relative performance changes in 40 adopters of residual income-based compensation measures such as EVA and a matched sample of non-users. Compared to the control firms, residual income firms decrease new investments, increase payouts to shareholders through share repurchases, and utilize assets more intensively, leading to significantly greater change in residual income. Wallace (1997) also finds weak evidence that stock market participants respond favorably to the adoption of residual income-based compensation plans.

Wallace's (1997) study examines *changes* in performance rather than performance *levels*, and only examines performance changes over one year. Hogan and Lewis (1999) extend his study by investigating performance changes over a four year period, and by matching control firms on *past* performance to control for possible mean reversion in performance levels. They find that adopters of residual income measures are relatively poor performers prior to the compensation plans' implementation, and that the improved stock returns and operating performance reported by Wallace (1997) may not be unique to economic value adopters. After introducing past profitability as an additional matching criteria, they find no significant difference in the stock price or operating performance of their two groups, and conclude that economic value plans are no better in their ability to

create shareholder wealth than traditional plans blending earnings-based bonuses and stock-based compensation.

#### *4.1.2 Limitations and Research Opportunities*

Perhaps the biggest limitation in the preceding studies is the use of publicly available data on EVA values and uses. Studies of EVA's predictive ability typically employ published EVA data estimated by the consulting firm Stern Stewart. However, these numbers are computed using public financial data, and contain relatively few of the accounting adjustments EVA proponents encourage companies to make to more closely approximate "economic profits."<sup>8</sup> This may understate the value of the measures since the published figures exclude the detailed firm-specific adjustments Stern Stewart and other consultants perform for their clients (Garvey and Milbourn, 2000). It also is unclear whether the estimated EVA figures are even appropriate for firms that have not implemented EVA systems.

A second limitation from the use of public data is the primary focus on EVA-based compensation for executives, rather than other uses such as capital budgeting or lower-level compensation that may be harder to identify from public sources. Although Stern et al. (1995) argue that effective implementation of EVA requires firms to make this measure the cornerstone of a total management system that focuses on EVA for capital budgeting, goal setting, investor communication, and compensation, surveys suggest that the majority of EVA and VBM adopters continue to place heavy emphasis on traditional accounting objectives for various purposes (KPMG Consulting, 1999). Furthermore, the

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<sup>8</sup> Stern Stewart recommends up to 160 adjustments that firms can make to more closely approximate "economic profits." Common adjustments include modifications to the deferred income tax reserve, the LIFO reserve, the treatment of intangible assets such as research and development and advertising, and goodwill amortization (see Stewart [1991, 113-117] for other recommended adjustments). Stern Stewart's

majority of firms adopting economic value measures do *not* use the measures in incentive plans (Ittner and Larcker, 1998a), suggesting that studies focused on EVA-based compensation plans identify only a small fraction of EVA users.

Research to date has also emphasized the value relevance of EVA or other residual income-based economic value measures, despite surveys finding substantial use of cashflow-based measures such as CFROI in value-based management programs (PricewaterhouseCoopers, 1999). Considerable debate exists over the relative ability of different economic value measures (EVA, CFROI, or variants of these measures) to predict stock returns, with many consulting firms claiming that their economic value measures are far better indicators of value creation than EVA (Myers, 1996; *The Economist*, 1996). Researchers can examine the circumstances under which the alternative value-based measures are more predictive of stock returns than EVA or traditional accounting measures, and the potential factors (e.g., competitive environment, environmental uncertainty, and product or industry life cycle) explaining any cross-sectional differences in predictive ability.

A final issue is whether shareholder wealth maximization should drive the choice of internal objectives. Many firms believe that a broader “stakeholder” approach to organizational objectives is preferred to a single-minded focus on shareholders.<sup>9</sup> The VBM adopters surveyed by KPMG Consulting (1999) rated customers their most important stakeholders (with shareholders second and employees third), and customer

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publicly available database makes an unspecified “handful” of standard adjustments, and excludes firm-specific adjustments made for its clients.

<sup>9</sup> The adoption of a stakeholder approach need not be inconsistent with shareholder wealth creation. Berman et al. (1999), for example, argue that concern for multiple stakeholders (e.g., employees, customers, community, and the environment) may be motivated by the perception that this approach improves financial performance, rather than a moral commitment to the stakeholder groups. Their empirical tests provide some support for this proposition.

satisfaction their second most important corporate goal (behind profits but ahead of stock returns and economic value measures). Despite these differing perspectives, relatively little is known about the effects of different objectives on strategic choices, organizational design, and firm performance. Thus, an important question is whether the choice of internal objectives actually influences corporate success.<sup>10</sup>

#### *4.2 Strategy Development and Organizational Design Choices*

Proponents of value-based management contend that the second step in the VBM process is selecting specific strategies and organizational designs to achieve the chosen objectives. This step is consistent with many economics-based organizational design frameworks and analytical models. Brickley et al.'s (1995) framework, for example, suggests that a firm's "organizational architecture," including the assignment of decision-rights to employees, is directly influenced by the firm's financial and non-financial goals and business strategy (see Figure 2). Similarly, Milgrom and Roberts (1995) model the benefits from greater "fit" between the firm's strategy, organizational structure, and management processes.

This section begins by reviewing empirical studies on the relations among managerial accounting practices, firm strategy, and operational strategies. Because this topic has been comprehensively reviewed in earlier papers (e.g., Dent, 1990; Langfield-Smith, 1997), we focus much of our attention on the measurement of strategy in empirical studies. We then examine research on organizational design, an issue that has received

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<sup>10</sup> A related issue is the applicability of the value-based management framework in private and non-profit organizations, which do not have shareholder value enhancement as an organizational objective. Despite this difference in objectives, many non-profit organizations follow a similar planning and control process



more attention in analytical studies of managerial accounting practices than in empirical studies. Using survey evidence from financial services firms, we highlight some of the limitations in these studies and suggest potential avenues for future research.

#### *4.2.1 Strategy and Managerial Accounting Research*

As with the choice of organizational objectives, the managerial accounting literature generally takes strategy as given and examines the association between strategic choices and the organization's accounting and control system design. These studies typically measure strategy as a continuum between firms following a "defender," "harvest," or "cost leadership" strategy and firms following a "prospector," "build," or "innovation" strategy (Dent, 1990; Langfield-Smith, 1997). As defined in the strategy literature, a "defender," "harvest," or "cost leadership" strategy focuses on being the low cost producer of a narrow product range, while a "prospector," "build," or "innovation" strategy focuses on being first-to-market with a variety of innovative products or services (e.g., Miles and Snow, 1978; Porter, 1985). Although a useful indicator of organizational strategy, this simple continuum misses the multi-dimensional nature of strategic choices. Strategy researchers, for example, argue that viable strategies other than strict cost leadership or innovation exist, such as providing higher quality than competitors, differentiating products through image, superior customer service, or focus on a particular market niche, or being more flexible in responding to customer demands or copying competitors' innovations (Miles and Snow, 1978; Porter, 1985).

A related measure that is widely used in accounting research is "perceived environmental uncertainty" (or PEU). The managerial accounting literature defines

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(e.g., General Accounting Office, 1998). Thus, an interesting research issue is the benefits of this general approach in publicly-traded companies relative to private or non-profit organizations.

environmental uncertainty as (1) lack of information regarding the environmental factors affecting a given decision-making situation, (2) not knowing how much the organization will lose if a specific decision is incorrect, and (3) the difficulty in assigning probabilities with any degree of certainty as to how environmental factors are going to affect the success or failure of a decision (Fisher, 1995). Research suggests that competitive strategy and environmental uncertainty are related, with more innovative “prospector” firms facing greater uncertainty than firms following a cost leader or “defender” strategy (Fisher, 1995). However, using perceived environmental uncertainty as a strategy proxy is problematic. First, environmental uncertainty is likely to be influenced by many factors other than strategy, including such exogenous factors as market competition, technological changes, and political conditions. Second, using managers’ *perceptions* of environmental uncertainty rather than objective measures of environmental conditions makes it difficult to discern which factors the managers considered when responding.

Other common proxies for strategy are publicly-disclosed information on research and development expenditures and market-to-book ratios, which are assumed to reflect the firm’s “growth opportunities” or the extent to which the firm follows an innovation strategy. However, measures such as these are likely to be noisy proxies for growth opportunities or strategic choices. Market-to-book ratios, for example, tend to vary by industry. Consequently, this measure may simply be picking up industry effects in large cross-sectional studies, with little ability to distinguish strategy differences *within* an industry. Similarly, many firms do not report research and development expenditures, even though they may still be innovative along dimensions that are not captured in

research and development expenditures (e.g., product and process flexibility, distribution, information technology, etc.).

Although the primary focus in managerial accounting studies is corporate or business unit strategy, other studies examine lower-level operational strategies such as just-in-time production, flexible manufacturing systems, and total quality management (e.g., Daniel and Reitsperger, 1991; Banker et al., 1993; Young and Selto, 1993; Abernethy and Lillis, 1995; Ittner and Larcker, 1995, 1997; Perera et al., 1997; Sim and Killough, 1998; Scott and Tiessen, 1999). These studies typically ignore the higher-level strategic choices made by the firm, even though all of these choices are expected to influence accounting and control system design and organizational performance. Most of these studies also examine only one operational strategy at a time, despite evidence that many companies simultaneously adopt multiple operational strategies (e.g., just-in-time production in conjunction with total quality management).<sup>11</sup>

#### *4.2.2 Organizational Design in Managerial Accounting Research*

In contrast to the large body of analytical research on the optimal choice of organizational design (e.g., Melumad et al., 1992; Baiman et al., 1995), relatively few empirical studies examine the determinants of organizational design. Instead, empirical studies often assume that some relation exists between organizational design choices (e.g., decentralization, allocation of decision rights, or interdependencies) and strategy (or perceived environmental uncertainty), and examine their interactive effect on control

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<sup>11</sup> An exception is Chenhall and Langfield-Smith (1998), who use cluster analysis to examine the effects of “bundles” of organizational practices (i.e., higher-level strategies, operational strategies, and management accounting techniques) on perceived performance. One limitation of this approach is the inability to determine whether *all* of the practices used by high performing organizations are necessary, or whether some of the practices provide greater performance benefits than others.

system design or performance.<sup>12</sup> An exception is Vancil's (1978) early work on decentralization. Using simple univariate statistical methods, Vancil finds diversification strategies positively associated with the number of functions performed by a profit center and the degree to which profit center managers have control over the assigned costs of centralized operations.

More recent studies investigate the factors influencing the design of production activities. Economic theories contend that successful adoption of advanced manufacturing strategies requires simultaneous changes in organizational design and managerial processes (e.g., Milgrom and Roberts, 1995; Wruck and Jensen, 1994). Abernethy and Lillis (1995) examine these claims by testing the relation between the adoption of flexible manufacturing systems and integrative liaison devices such as teams, meetings, and task forces. Their simple correlation analyses indicate that the extent to which organizations adopt a flexible manufacturing strategy is positively associated with the use of these integrative devices. In contrast, Selto et al. (1995) report that production worker authority in a manufacturing plant that adopted just-in-time production is not statistically associated with task difficulty or variability or with the job's dependency on workgroup involvement. However, the extent to which work is standardized is negatively associated with task difficulty or variability and positively associated with the job's dependency on the workgroup. Scott and Tiessen's (1999) results are also mixed, with the proportion of time spent in *inter*-departmental teams increasing with manufacturing task complexity, but having *no* relation with the number of organizational

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<sup>12</sup> For examples of accounting studies using organizational design characteristics as independent variables, see Bruns and Waterhouse (1975), Hayes (1977); Larcker (1981), Scapen and Sale (1985), Chenhall and Morris (1986), Govindarajan and Fisher (1990); Mia and Chenhall (1994), Chong (1996); Bushman et al. (1996), and Keating (1997).

levels in the plant or the extent of reciprocal relations among departments. Time spent in *intra*-departmental teams, on the other hand, increases with more extensive reciprocal relations, but falls with greater task complexity. Thus, the relation between organizational design practices and manufacturing strategies remains unclear.

#### *4.2.3 Limitations and Research Opportunities*

One of the keys to improving research in this area is improving the measurement of strategy. As discussed above, most studies measure this construct using a simple continuum between firms following a cost leadership strategy and those following an innovation or growth-oriented strategy. Given the multidimensional nature of corporate strategy, a single measure is unlikely to capture many relevant strategic distinctions (e.g., innovative companies pursuing a niche or differentiation strategy versus those pursuing a mass market strategy). Table 1 illustrates this problem using survey data we collected from 148 financial service firms.<sup>13</sup> We asked senior executives from these firms to evaluate 12 aspects of the company's organizational strategy and corporate environment that are commonly used to measure strategy and perceived environmental uncertainty. Principal components analysis (with oblique rotation) reveals three factors with eigenvalues greater than one.<sup>14</sup> The factors capture the extent to which the firm's strategy focuses on innovation (denoted INNOV), flexibility in changing its product and service offerings and responding to market demands (denoted FLEX), and the pursuit of existing customers and markets in predictable environments (denoted PREDICT). One question asking whether the firm is more cost efficient than its competitors did not load

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<sup>13</sup> The survey data on financial service firms were jointly collected by the authors and the Cap Gemini Ernst & Young Center for Business Innovation.

<sup>14</sup> Specific questions and their assignment to the three strategy constructs are provided in Table 1.

greater than 0.40 on *any* of the factors, even though this characteristic is generally assumed to be a key strategic attribute. This question is dropped from the analysis.

\*\*\* Table 1 about here \*\*\*

Table 1 provides correlations among the three resulting constructs and the firm's book-to-market ratio (denoted BTOM, a commonly used *inverse* measure of growth opportunities). The correlations suggest that some of the strategic dimensions are not independent. In particular, flexibility (FLEX) and product and service innovation (INNOV) have a strong, positive correlation (two-tailed  $p < 0.001$ ). Innovation and market stability (PREDICT) also have a marginally significant positive correlation (Pearson correlation = 0.14, two-tailed  $p = 0.09$ ), *not* the negative association often assumed in accounting research. In contrast, the book-to-market ratio is not significantly correlated with any of the survey-based strategy proxies. Although the insignificant associations with BTOM are due in part to the computation of book-to-market ratios in financial service firms (where investments in securities are marked-to-market), this evidence indicates that publicly available strategy proxies such as BTOM may not be appropriate in all settings. Taken together, the principal components analysis and correlations highlight the need to incorporate constructs that capture multiple strategic dimensions, and to examine their individual and joint effects on managerial accounting practices and firm performance.

Future studies can also examine whether objectives, strategies, and organizational designs are simultaneously determined. Some economic theories suggest that these

choices should be made jointly (Brickley et al., 1997a; Milgrom and Roberts, 1995), rather than sequentially as shown in the VBM framework. Most studies, on the other hand, treat one or more of these decisions as exogenous, independent variables in their empirical specifications. The typical approach is to assume a causal relation running from strategy or organizational design to the design of managerial accounting and control systems. However, the direction of causality may actually be opposite, with accounting system design promoting or inhibiting the adoption of certain strategies (e.g., Dent, 1990; Langfield-Smith, 1997). Additional research using simultaneous equations methods can shed light on the actual direction of causality among these choices.

One important issue that has received almost no attention in empirical studies is the effect of organizational objectives on the choice of strategies and organizational design. VBM frameworks suggest that the choice of internal objectives should determine the strategies and organizational designs adopted to achieve these objectives. Case study research provides some support for this assertion. Studies by Baker and Wruck (1989) and Wruck (1994) describe how increased leverage led their two case study sites to modify internal objectives, decentralize decision-making, and reorganize manufacturing processes. Similarly, Dial and Murphy (1995) discuss how the adoption of an explicit corporate objective of increasing shareholder value led to changes in corporate strategy and organization. Large-sample studies can extend these studies by examining the extent to which changes in organizational objectives affect companies' strategies and organizational designs.

Finally, more research is needed on the determinants of organizational design choices. Managerial accounting theory suggests that these choices are critical



components of the management control package (e.g., Melumad et al., 1992; Baiman et al., 1995; Brickley et al., 1997a). Yet relatively little attention has been paid to the factors influencing organizational design. Where these studies have been conducted, they have been limited to a very small subset of the organizational choices made by the firm. Empirical studies can extend this literature by testing the hypotheses generated by managerial accounting theories, and determining whether the broad set of organizational design choices are complements or substitutes for other management control practices.

#### *4.3 Identification of Value Drivers*

Agency models indicate that the goal of control systems is promoting congruence between the actions taken by the agent and the actions desired by the principal. If the principal's ultimate objective is maximizing shareholder value, these models suggest that control systems should emphasize those actions that are expected to increase shareholder returns. The value-based management process goes a step further by focusing on the identification of the financial and operational "value drivers" that lead to increased shareholder value. Identification of these drivers and their interrelations is expected to improve resource allocation, performance measurement, and the design of information systems by identifying the specific actions or factors that cause costs to arise or revenues to change. This section reviews three managerial accounting research streams that focus on the identification and measurement of value drivers: (1) activity-based costing (ABC), (2) strategic cost management, and (3) the balanced scorecard.

##### *4.3.1 Activity-Based Costing*

Activity-based costing studies emphasize the ability of non-volume related measures to predict overhead usage (Cooper and Kaplan, 1991). In doing so, this literature focuses

on how improved understanding of *cost* drivers can improve the allocation of overhead and thereby improve decision-making. The ABC literature also highlights the role increased understanding of cost drivers can play in reducing “non-value-added” activities that reduce efficiency while adding little or no value to the customer (also known as activity-based management).

Most value driver research to date has tested the ABC literature’s claims that cost drivers other than volume explain a significant proportion of overhead costs. Contrary to these claims, Foster and Gupta’s (1990) cross-sectional analysis of data from 37 manufacturing plants owned by one firm provides little evidence that complexity or efficiency-related variables explain overhead costs. In contrast, Banker et al.’s (1995) cross-sectional study of 31 plants in three industries finds complexity variables significantly associated with overhead costs, even after controlling for direct labor costs (a proxy for volume). Banker and Johnston’s (1993) cross-sectional analysis of the airline industry yields similar results. Several longitudinal studies find significant positive relations between overhead costs and non-volume cost drivers (Anderson, 1995; Platt, 1996; Ittner et al., 1997; Fisher and Ittner, 1999), but the incremental explanatory power from the non-volume measures generally is quite small.

Research has also examined other assumptions underlying the ABC concept. Noreen and Soderstrom (1994) and Maher and Marais (1998) use data from hospitals to examine whether overhead costs are proportional to activity. Their results suggest that ABC systems that assume costs are strictly proportional to their drivers grossly overstate relevant costs for decision-making and performance evaluation purposes. However, the importance of this finding is unclear. Most managerial accounting textbooks discuss the

concept of the “relevant range.” This concept maintains that cost functions are non-linear, but that linear assumptions can still be appropriate within a relatively narrow range of potential production or activity volumes. Thus, the extent to which the linear assumptions embedded in ABC and other costing system harm decision-making remains an open issue.

MacArthur and Stranahan (1998) also use hospital data to investigate whether the level of hospital complexity is simultaneously determined with the level of overhead costs needed to support this complexity. Unlike most studies that assume complexity is an exogenous determinant of overhead, MacArthur and Stranahan’s (1998) analyses indicate that these choices are jointly determined. In a similar vein, Datar et al. (1993) examine interdependencies among cost drivers, which ABC approaches typically ignore. Analysis of product-level data from one plant indicates that supervision, maintenance, and scrap costs are simultaneously determined, leading the researchers to conclude that failure to recognize this simultaneity results in inaccurate estimates of cost driver effects.

Ittner et al. (1997) investigate the descriptive validity and performance consequences of Cooper and Kaplan’s (1991) “overhead cost hierarchy.” Principal components analysis of a wide variety of manufacturing measures indicates that these measures generally corresponded to the unit, batch, and product-sustaining categories proposed in Cooper and Kaplan’s (1991) cost hierarchy. However, activities related to the various cost hierarchy levels are not independent, consistent with Datar et al.’s (1993) conclusion that choices among cost drivers can be interdependent. In addition, any cost increases from increased unit and product-sustaining activities tend to be offset by revenue

increases from higher sales volumes and greater product variety at their research site, indicating that cost drivers should not be examined in isolation from their revenue effects.

#### *4.2.2 Strategic Cost Management and the Balanced Scorecard*

The strategic cost management literature extends the ABC concept by focusing not only on the *structural* drivers of overhead costs (such as the organization's scale and scope, the level and type of technology, and product variety strategy), but also on *executional* cost drivers that hinge on the organization's ability to "execute" its operations efficiently and effectively (Porter, 1985; Riley, 1987; Shank and Govindarajan, 1994; Shields and Young, 1995). Key executional cost drivers in this literature include practices such as work force involvement, customer and supplier relations, the extent of total quality management activities, plant layout, and product and process design.

The balanced scorecard concept moves beyond the analysis of cost drivers to emphasize the measurement of performance along multiple dimensions of "value drivers," including financial performance, customer relations, internal business processes, and learning and innovation, that are linked in a causal "business model" of leading and lagging performance drivers and outcomes (Kaplan and Norton, 1996). Kaplan and Norton (1996) contend that an integrated balanced scorecard allows managers to better understand the relations among various strategic objectives, to communicate the association between employees' actions and the chosen strategic goals, and to allocate resources and set priorities based on the initiatives' contributions to long-term strategic objectives.

Studies within these research streams typically examine claims that non-financial measures are “leading” indicators or drivers of future financial performance. Many of these studies investigate the relation between customer satisfaction measures and subsequent accounting or stock returns, with mixed results. Banker et al. (2000) and Behn and Riley (1999) find positive associations between customer satisfaction measures and future accounting performance in the hotel and airline industries, respectively. Ittner and Larcker’s (1998b) investigation of customer, business unit, and firm-level data also supports claims that customer satisfaction measures are leading indicators of customer purchase behavior, accounting performance, and current market value. However, the relation between customer satisfaction and future performance is non-linear, with little performance effect at high satisfaction levels. In addition, their firm-level results vary by industry, with positive relations in some industries and negative or insignificant relations in others. Foster and Gupta’s (1997) study of customer data from a wholesale beverage distributor also finds positive, negative, or insignificant results depending upon the questions included in the satisfaction measures or the model specification (levels or percentage changes).

Surprisingly little research has been conducted on the balanced scorecard concept, despite considerable interest in the topic. What evidence that exists provides limited support for the scorecard’s claimed benefits. A survey of Australian manufacturers by Chenhall and Langfield-Smith (1998) indicates that the average plant rated the benefits from “balanced performance measures” 3.81 on a scale ranging from 1 (no benefit) to 7 (high benefit), with higher and lower performing plants reporting no consistent differences in the perceived benefits from balanced performance measures. The modest

perceived benefits from balanced performance measures are supported by Ittner et al. (2001), who find that the implementation of a balanced scorecard compensation plan in a retail bank brought no significant change in branch managers' understanding of strategic goals or their connection to the managers' actions, and was associated with *lower* perceived adequacy of information on managers' progress towards business goals.

#### *4.2.3 Limitations and Research Opportunities Related to ABC and Cost Drivers*

Overall, the cost driver analyses provide evidence that factors other than volume have a statistically significant relation with overhead, and tend to verify at least some of the key assumptions of ABC. However, this work has a number of limitations. Many of the studies use direct labor costs as a proxy for production volume. Although consistent with the overhead allocation base used in many traditional cost accounting systems, including direct labor as an independent variable causes the effects of non-volume cost drivers to be understated if these drivers also impact direct labor requirements. Ittner and MacDuffie (1995) find that cost drivers such as product variety and automation affect manufacturing overhead not only directly, but also indirectly through increased direct labor requirements and the resulting need for higher supervisory and administrative staffing. Similarly, Dopuch and Gupta (1994) and Fisher and Ittner (1999) find significant associations between direct labor costs and non-volume cost drivers such as the number of production batches and product mix variability, even after controlling for production volumes. If researchers are to develop a deeper understanding of value drivers, both the direct and indirect effects of these drivers must be taken into account.

Cost driver studies also contain little discussion of the contingency factors influencing the relative importance of different value drivers. Although an examination of

individual cost driver studies in different industries suggests that factors such as technology, production process (e.g., batch to mass production), and scheduling practices affect the importance of various cost drivers, no study has explicitly investigated how these and other contingent factors moderate cost driver effects.

Most prior studies also ignore executional cost drivers such as product manufacturability and work practices, even though these drivers may be harder to replicate and potentially more valuable for achieving competitive advantage (Porter, 1985; Riley, 1987; Shank and Govindarajan, 1994). Ittner and MacDuffie (1995) find that differences in work systems (e.g., worker involvement, use of teams, and job rotation) rather than differences in structural cost drivers (e.g., product variety) explain much of the overhead labor advantage found in Japanese automobile assembly plants relative to their western competitors. These results suggest that greater understanding of the methods available to control costs will require researchers to examine both executional and structural cost drivers.

One promising avenue for future research is exploring the influence of structural and executional cost drivers on the entire value chain. The strategic cost management literature argues that cost driver analyses should not be limited to the activities carried out within the firm, but should also incorporate linkages with suppliers and customers. Analyzing cost drivers throughout the value chain is essential for determining where in the value chain—from design to distribution—costs can be lowered or customer value enhanced (Hergert and Morris, 1989; Shank and Govindarajan, 1994).

It will also be important to understand the interactions and tradeoffs among the various structural and executional cost drivers. With the exception of Datar et al. (1993),



prior studies treat the various cost drivers as independent. However, cost drivers frequently counteract or reinforce each other (Porter, 1985, p. 84). The presence of counteracting and reinforcing cost drivers implies the need to optimize entire processes to generate lasting improvements in cost position relative to competitors. Future research can attempt to identify and resolve these tradeoffs in different settings.

Most importantly, studies need to determine whether improved understanding of cost drivers leads managers to make better decisions or improves organizational performance (Dopuch, 1993). Research on ABC success relies almost exclusively on *perceptual* outcome measures, such as the extent of ABC system usage or the perceived benefits from adoption.<sup>15</sup> In general, these studies report moderate satisfaction with ABC. While perceptual measures such as these are useful for evaluating ABC implementation success, they provide no evidence that ABC adopters achieve higher operational or financial performance than non-adopters. Indeed, other studies suggest that many ABC adopters have abandoned their systems<sup>16</sup>, raising questions about the performance consequences of ABC implementation and use.

#### *4.2.4 Limitations and Research Opportunities Related to Non-Financial Value Drivers*

Studies examining the value relevance of non-financial performance measures are plagued by many of the same limitations as the cost driver studies. In particular, the studies examine only one of many potential non-financial value drivers, and ignore interactions with other potential value drivers. These limitations can result in misleading

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<sup>15</sup> See, for example, Shields, 1995; Swenson, 1995; Foster and Swenson, 1997; McGowan and Klammer, 1997; McGowan, 1998; and Anderson and Young, 1999.

<sup>16</sup> Ness and Cucuzza (1995), for example, estimate that only 10% of firms that adopt ABC continue to use it. Gosselin (1997) finds that 36.4% of Canadian business units that adopted ABC later dropped the systems, while Innes and Mitchell (1991) find that 60% of ABC adopters in the U.K. stopped using the systems.

inferences if non-financial measures are highly correlated (i.e., correlated omitted variable bias), or if different non-financial value drivers are complements or substitutes.

To provide some evidence on these issues, we asked senior executives from the 148 financial service firms discussed earlier to rate the extent to which various performance categories are important drivers of their firms' long-term organizational success. Their responses are shown in Figure 4. Despite the emphasis on financial measures in accounting research, short-term financial performance ranks only fifth most important, behind customer relations, operational performance, product and service quality, and employee relations. Innovation and community relations also receive relatively high importance scores.

\*\*\* Figure 4 about here \*\*\*

The scores given to the non-financial performance categories are highly correlated. Seventy-two percent of correlations among the non-financial categories (not reported in the tables) are significant at the one percent level (two-tailed). For example, customer relations (the highest rated value driver) has a correlation of 0.40 or greater with operational performance, quality, employee relations, innovation, and community relations, suggesting that these performance categories may be complementary. None of the correlations is significantly negative, providing no evidence that the categories are perceived to be substitutes. The significant relations among performance categories suggest that efforts to understand the value relevance of non-financial performance

measures require researchers to examine a broader set of potential drivers and their interactions.

Non-financial value driver studies also ignore contingent factors, even though it is likely that issues such as strategy, competitive environment, and customer requirements moderate the relation between these drivers and economic performance, and may explain the mixed results in prior studies. The survey data in Table 2, for example, document significant associations between perceived value drivers and organizational strategy. The table provides correlations between the financial service firms' strategy constructs (described in Table 1) and perceived value drivers (described in Figure 4). Customer-related performance is perceived to be more important to long-term success when the firm follows an innovative strategy (INNOV), but is not associated with flexibility (FLEX) or the pursuit of existing customers or markets (PREDICT). When the firm pursues existing customers and operates in relatively predictable markets (PREDICT), community relations are believed to be more important. Flexibility and innovation, in turn, are both associated with higher importance scores for employee relations, quality, alliances, supplier relations, and innovation. Ignoring contingent factors such as these leaves our understanding of value drivers rudimentary.

\*\*\* Table 2 about here \*\*\*

An interesting question is the effect information technologies will have on the identification and importance of value drivers. Many enterprise resource planning (ERP) systems now contain "data mining" capabilities that allow companies to more easily

identify statistical relations among performance measures. Integrated systems and the internet are also making data interchange easier, potentially reducing the costs associated with traditional cost drivers such as order taking and engineering changes. Anderson and Lanen (2000), for example, find that electronic data interchange with suppliers can mitigate some of the costs of complexity identified in earlier cost driver studies. Studies can extend their analysis to other forms of information technology and other managerial accounting topics.

The use of “business models” that link multiple value drivers in a causal chain of leading and lagging performance indicators offers another research opportunity. Both the balanced scorecard and VBM literatures maintain that companies must develop explicit business models in order to identify which drivers have the biggest impact on value and to communicate how the organization’s objectives and strategies are to be achieved (e.g., Copeland et al., 1996; Kaplan and Norton, 1996).<sup>17</sup> Yet little is known about how (or if) companies develop explicit business models or how these models vary depending upon the organization’s strategies, objectives, and organizational design.

Finally, the performance effects of the balanced scorecard and other value driver techniques remain open issues. Despite widespread adoption of these practices, we still have little hard evidence that company performance improves with their use. Additional research on the performance effects of these practices can make a significant contribution to the managerial accounting literature.<sup>18</sup>

#### *4.4 Developing Action Plans, Selecting Measures, and Setting Targets*

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<sup>17</sup> See Rucci et al. (1998) for an example of the causal business model developed by Sears, Roebuck and Company.

<sup>18</sup> It is likely that these practices are not equally beneficial in all settings, requiring researchers to examine the contingency factors that influence the performance effects (if any) from these techniques. See Gosselin

Most economic and contingency theories in managerial accounting emphasize both the decision-making process and the development of performance measures and compensation plans that encourage employees to take the actions desired by the owners of the firm. Similarly, the fourth step in the value-based management framework is developing action plans based on the value driver analysis and selecting the measures and targets that will be used to monitor their success. This section examines these issues by reviewing research on (1) the selection of investments and action plans, (2) the choice of performance measures, and (3) the setting of performance targets.

#### *4.4.1 Selection of Action Plans*

The choice of specific action plans has received virtually no attention in the managerial accounting literature, with one exception—the selection of capital investments. The majority of empirical studies in this area examine whether firms using sophisticated capital budgeting techniques such as discounted cash flow and internal rate of return perform better than firms using simpler methods such as payback period or accounting rate of return. Studies by Klammer (1973) and Haka et al. (1985) find no evidence that more sophisticated capital budgeting techniques improve performance. Haka (1987) extends these studies by testing a contingency theory of discounted cash flow (DCF) effectiveness. She finds that shareholder returns are higher when DCF techniques are used in predictable environments and are accompanied by the use of long-term reward systems and decentralized capital budgeting processes. Other factors such as firm strategy and environmental diversity have no significant impact on DCF effectiveness.

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(1997) and Krumwiede (1998) for studies examining some of the contextual factors associated with the adoption, implementation, and abandonment of activity-based costing systems.

One criticism of these studies is their exclusive focus on quantitative, financial analyses, ignoring the many other types of information used in capital investment decisions. In contrast, Larcker (1981) examines the perceived importance of internal to external and financial to non-financial information in strategic capital budgeting, and their relation to decentralization, vertical integration, internal technology, and organizational size, as well as environmental dynamism, hostility, and heterogeneity. His results depend upon the stage of the decision process, with internal and external data equally important in problem identification and alternative development, and internal data more important in selection. Financial and non-financial information are equally important for all phases, but none of the contingency variables is statistically significant. Although these results suggest that non-financial and external information are important in capital budgeting, Larcker (1981) does not examine whether the performance effects of capital investments vary with the types of information used in the decision process.

Carr and Tomkin's (1996) analysis of 51 strategic investment decisions in the automobile components industry examines the value-based management framework's hypothesis that the effective choice of actions plans depends upon the sources of competitive advantage and the firm's value drivers. They find that "successful" companies place five times more attention on competitive issues, almost three times as much on value chain considerations such as customer relations, and twice as much on fundamental cost drivers as their less successful competitors, while devoting only a quarter as much attention to financial computations. Although intriguing, these results are limited by the authors' use of subjective variable coding and subjective performance evaluations, and by the lack of statistical tests.

#### 4.4.2 *Choice of Performance Measures*

Considerably more attention has been paid to the choice of performance measures. Although the VBM framework suggests that performance measure choices should be driven in part by the results of value driver analyses, most empirical studies go directly from the firm's organizational design, strategy, or technology choices to the choice of measurement systems. In general, these studies can be divided into two groups: (1) those examining a variety of information and control system attributes, and (2) those focused specifically on compensation criteria.

*Broad Control System Studies.* Several studies in the first group investigate the association between organizational design issues and performance measures. Hayes (1977) finds that performance measures of highly interdependent subunits are most useful when they include measures to assess managers' reliability, cooperation, and flexibility. Scott and Tiessen (1999) report a positive relation between the proportion of time spent in teams and the diversity of performance measures (both financial and non-financial) used in manufacturing plants. Scapen and Sales (1985), on the other hand, find no association between divisional autonomy and interdependencies and the financial criteria used to evaluate managerial performance, investment appraisal criteria (financial versus non-financial), or control over authorized capital projects.

Chenhall and Morris (1986) examine the perceived usefulness of four management accounting system attributes: scope (e.g., external, non-financial, and future-oriented), timeliness, integration, and level of aggregation. Decentralization is associated with a preference for aggregated and integrated information, perceived environmental uncertainty with broad scope and timely information, and organizational

interdependencies with broad scope, aggregated, and integrated information. Moreover, the effects of PEU and organizational interdependencies are due in part to indirect associations through decentralization. Gul and Chia (1994), in turn, test a three-way interaction between PEU, decentralization, and managerial accounting system scope and aggregation. They find decentralization and the availability of broad scope and aggregated data associated with higher perceived managerial performance under conditions of high PEU, but with lower performance under conditions of low PEU. Other studies finding significant relations between environmental uncertainty and information system design include Gordon and Narayanan (1983) and Chong (1996).

Consistent with most managerial accounting theories, strategy is also an important determinant of performance measurement and control systems. Simons (1987) finds that successful prospectors use a high degree of forecast data in control reports, set tight budget goals, and monitor outputs carefully, with little attention paid to cost control. Large prospectors emphasize frequent reporting and use uniform control systems that are modified frequently, while defenders use management control systems less actively. Guilding (1999) adds evidence that prospector firms and firms following a build strategy make greater use of competitor assessment systems and perceive these systems to be more useful than do defender firms or those following a harvest strategy.

Studies examining the association between manufacturing strategies and performance measurement systems have also found systematic links among these choices. In general, organizations following advanced manufacturing strategies such as just-in-time production, total quality management, and flexible manufacturing are positively associated with the provision of non-financial measures and goals such as defect rates,



on-time delivery, and machine utilization, as well as greater emphasis on non-financial measures in reward systems (e.g., Daniel and Reitsperger 1991; Banker et al., 1993; Ittner and Larcker, 1995; Perera et al., 1997). However, empirical support for the hypothesized performance benefits from these measurement practices is mixed. Abernethy and Lillis (1995) find higher perceived performance in “non-flexible” manufacturers when greater emphasis is placed on efficiency-based measures, but no significant correlation between the use of efficiency measures and the performance of “flexible” firms. Sim and Killough (1998) find benefits from the provision of performance goals and performance-contingent incentive plans in TQM and JIT plants, but not from the provision of quality and customer-related performance measures. Perera et al. (1997) also find no relation between the use of non-financial measures and perceived manufacturing performance. Ittner and Larcker (1995), in turn, report positive effects from the provision of problem-solving information and the use of non-financial reward criteria in organizations making little use of TQM practices, but no statistical association in organizations with extensive TQM programs. They conjecture that other TQM practices may substitute for these information and control mechanisms.

Finally, the first group of studies suggests that production technology plays a role in the use and benefits of budgetary control systems. Merchant’s (1984) research indicates that process automation is positively correlated with requirements for managers to explain variances and to their reactions to budget overruns. Dunk (1992) adds evidence that production subunit performance is high (low) when the use of budgetary controls and manufacturing automation are *both* high (low). Brownell and Merchant (1990) examine the influence of product standardization (e.g., one-of-a-kind vs. commodity) on the

performance effects of budget system design and use. Where product standardization is low, high budgetary participation and the use of budgets as static targets are more effective in promoting departmental performance. The type of process (job shop to continuous flow) has little effect on the utility of budget systems.

Overall, this set of studies generally supports theories that the choice of performance measures is a function of the organization's competitive environment, strategy, and organizational design, but the performance effects of these choices remains uncertain.

*Compensation Studies.* The second group of performance measure studies looks specifically at compensation plans. These studies examine many of the same factors as the first group of papers. Bushman et al. (1996) and Ittner et al. (1997) investigate the determinants of performance measure choices in CEO bonus contracts. Significant factors explaining the weights placed on individual and non-financial performance measures include the extent to which the firm follows a prospector strategy, the firm's growth opportunities (proxied by its market-to-book ratio), the adoption of strategic quality initiatives, the length of product development and product life cycles, industry regulation, and "noise" in traditional financial measures.

Executive compensation studies suggest that many of these same factors are also associated with the relative weight placed on accounting and market (e.g., stock price or stock return) measures.<sup>19</sup> Ely (1991) finds that the choice between alternative accounting measures varies by industry, suggesting that these measures must be tailored to reflect industry-specific value drivers and competitive environments. Lambert and Larcker (1987) and Sloan (1993) demonstrate that the weight placed on market measures relative

to accounting measures increases when accounting measures are noisier proxies of managerial effort, the firm has a higher growth rate, and managers hold less of the firm's equity. In a similar vein, Lewellen et al. (1987) and Gaver and Gaver (1993) find that stock-related compensation is higher when managers' time horizons need to be lengthened, while Bizjak et al. (1993) find that high growth firms place greater weight on long-term components of compensation (option and stock holdings) than short-term components (salary and annual bonus). Clinch (1991) also finds that the weight on stock returns relative to return on equity increases with large firms' growth rates. Surprisingly, the weight on stock returns is *lower* in smaller firms with high growth rates. Clinch (1991) finds similar results when stock returns are replaced with expenditures on research and development.

While the prior studies examine the types of performance measures used for compensation, other studies examine the organizational level at which performance criteria are measured. Bushman et al. (1995) investigate the factors affecting the use of business unit versus corporate-level performance measures in business unit compensation plans. They find the use of corporate measures positively associated with organizational interdependencies. A similar study by Keating (1997) examines the use of division and firm-level measures for division manager performance evaluation. Significant factors in the choice of measures are divisional growth opportunities, organizational interdependencies, and the division's size relative to the size of the company.

Ittner and Larcker (2001) extend these studies to incentive plans for non-management workers. They find that informativeness issues such as those addressed in economic

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<sup>19</sup> Although a full review of the executive compensation literature is outside the scope of this paper, comprehensive reviews on this topic can be found in Pavlik et al. (1993), Murphy (1998), and Bushman

theories are key factors in the selection of performance measures for worker incentive plans. However, they also find that other reasons for adopting the plan (e.g., improving pay-for-performance linkages and upgrading the workforce) play a role in worker-level performance measure choices, as do union representation and management participation in plan design. Moreover, the factors influencing the use of *specific* measures (e.g., accounting, cost control, quality, safety, etc.) vary, suggesting that the aggregate performance measure classifications commonly used in compensation research, such as the comparison of financial versus non-financial metrics, provide somewhat misleading inferences regarding performance measurement choices.

Although none of the straight compensation studies examines performance consequences, related research suggests that organizations that align their incentive plans' performance measures with contingency factors such as those discussed above achieve higher performance. Simons (1987) and Govindarajan (1988) both find higher performance in organizations following defender or low cost strategies when bonuses are awarded for the achievement of budget targets. Similarly, Govindarajan and Gupta (1985) find that greater reliance on non-financial compensation criteria (sales growth, market share, new product and market development, and political/public affairs) has a stronger positive impact in units following a build strategy than in those following a harvest strategy.

More important from a value-based management perspective, evidence on the benefits from tying compensation to EVA is mixed. As discussed earlier, studies by Wallace (1997) and Hogan and Lewis (1999) reach conflicting conclusions regarding the performance of firms adopting residual income-based compensation plans (such as EVA)

relative to the performance of control samples. In contrast, Wallace's (1998) survey of EVA users finds that firms using this measure for compensation purposes report greater awareness of the cost of capital, reduced average accounts receivable age, increased sales revenues, and a longer accounts receivable age than EVA users who do not use the measure for compensation. Given these mixed results, the benefits of EVA-based compensation plans remain an open issue.

#### *4.4.3 Target Setting*

Prior empirical studies typically ignore one of the key aspects of performance measurement—target setting. Targets play an important role in selecting action plans and investments and evaluating performance. However, in contrast to the large body of behavioral accounting research on target setting, almost no empirical research has been conducted on this topic. What little research that exists focuses on the development of targets for compensation purposes. Merchant and Manzoni (1989) provide evidence on the achievability of performance targets in bonus plans. Their case study research indicates that business unit managers reached their targets eighty to ninety percent of the time, a result that is inconsistent with prescriptions in the managerial accounting literature suggesting that budget targets should be achievable less than fifty percent of the time to provide optimum motivation. Interviews with these managers indicates that highly achievable targets are desirable because they improve corporate reporting, resource planning, and control, and can still be highly motivating in combination with other control system elements.

Murphy (1999) investigates the use of internal standards (budgets, prior year performance, and discretionary) versus external standards (peer group, timeless

standards, and cost of capital) in executive incentive plans. He finds that companies are more likely to choose external standards (which are less easily affected by management actions) when prior-year performance is a noisy estimate of contemporaneous performance. Moreover, companies using budget and other internally determined performance standards have less variable bonus payments and are more likely to smooth earnings than those using externally determined standards.

Indjejikian et al. (2000) find that managers' earned bonuses exceed target bonuses on average, and that target bonuses are adjusted upward (downward) in response to performance above (below) the standard in a prior year (known as the "ratchet effect"). In addition, the magnitude of the difference between earned and target bonus is related to proxies for information asymmetries between managers and their superiors. Unfortunately, none of these studies examines the performance consequences associated differences in target setting practices.

#### *4.4.4 Limitations*

The preceding studies generally support theories that the choice of action plans and performance measures is contingent on organizational characteristics. However, the studies have several shortcomings. First, each examines only one or a few uses of performance measures (e.g., compensation or capital justification) and ignores other potential uses (e.g., planning and problem identification) that may be equally or more important to firm success. Second, the studies do not investigate the consistency in performance measures used for different purposes or the alignment between the measures and the firm's specific value drivers, despite claims that performance is enhanced when measurement systems are aligned with critical success factors (Dixon et al., 1990; Lingle

and Schiemann, 1996). Third, the studies overlook the quality of information used for decision-making and control (e.g., accessibility, timeliness, and reliability), even though information system characteristics are likely to influence decision-making quality and the incentive effects of control systems.

We illustrate some of the issues raised by these omissions using survey data from the 148 financial service firms. Figure 5 provides information on the consistency between (1) the perceived importance of individual value drivers, (2) the performance measures used for identifying problems and developing actions plans, evaluating capital investments, and evaluating managerial performance, and (3) the development of formal goals for each performance category. We define a “measurement gap” as the *difference* between the perceived importance of each performance category and the extent to which (1) the performance category is used for internal purposes, and (2) formal strategic goals are established for the category. A firm is assumed to have zero “gap” if the score for internal usage or goal setting is greater than or equal to the perceived importance score.

\*\*\* Figure 5 about here \*\*\*

With the exception of financial and operational performance, substantial gaps exist for all of the higher ranked performance categories. The gaps vary across uses, indicating that extensive use of performance measures for one purpose does not necessarily imply that the measures are used for other purposes. The largest gaps relate to the use of customer, employee, and community measures for evaluating capital investments. Gaps for identifying problems and developing action plans generally are

smaller than those associated with other uses. These responses raise a number of points that have been overlooked in prior studies. For example, do the same contingency factors influence the performance measures chosen for different purposes? Does consistency in the measures used for various purposes improve performance? Are some performance measure choices (e.g., performance evaluation and compensation) more important than others? Are greater “measurement gaps” associated with lower organizational performance? Attempts to address these questions not only require researchers to understand the value drivers within an organization, but also require studies to examine a much broader set of measurement choices than has been done in the past.

Figure 6 compares the mean importance scores for each performance category to the respondents’ rating of measurement quality for each category (where 1 = extremely poor quality of measurement and 6 = high quality of measurement). With the exception of short-term financial performance, measurement quality ranks lower than importance for each performance category. Particularly large differences exist for some of the most important value driver categories, suggesting that studies investigating the internal use and benefits of these performance measures are incomplete without considering how well this information is measured.

\*\*\* Figure 6 about here \*\*\*

Most prior studies have also assumed that the goal of performance evaluation and compensation systems is motivating employees to act in the manner desired by the owners of the firm. Although consistent with agency models, this assumption ignores



other potential implementation goals such as attracting and retaining employees, shifting compensation risk from the firm to employees, and developing careers. As shown in Table 3, these goals can play a significant role in the design of performance evaluation and compensation systems. The table lists the relative importance placed on various objectives when conducting performance appraisals, designing non-management incentive plans, and developing stock option plans.<sup>20</sup> The data in Panel A of Table 3, for example, indicate that most companies use performance appraisals for career development as well as for compensation. In fact, 61.4 percent of the respondents stated that the use of performance evaluations for career development is of equal or more importance than the evaluations' use in determining compensation.

\*\*\* Table 3 about here \*\*\*

Panel B reports the importance companies place on various reasons for introducing non-management incentive plans. Although most plans are designed to improve business performance and profitability, the methods for achieving these objectives vary. The implementation reason receiving the largest number of "high importance" ratings is fostering teamwork, followed by better pay-performance linkage and enhancing communication of business objectives. In contrast, providing a method to allocate available award funds to high performing individuals and teams is among the *least* important reasons for implementing the plan.

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<sup>20</sup> Survey data on performance appraisals were provided by the consulting firm Watson Wyatt. Data on non-management incentive plans were provided by the Consortium for Alternative Reward Strategies Research. The consulting firm iQuantic provided data on stock option plans in high technology companies.

Panel C provides information on the reasons for adopting ongoing stock option plans in high technology firms. The most important factor by far is retaining existing employees. Providing competitive total compensation and attracting new employees also rank relatively high. Rewarding past performance, encouraging stock ownership, and rewarding specific project milestones or goals, on the other hand, rank among the lowest objectives. Taken together, the survey evidence in Table 3 indicates that employee motivation is only one of many reasons for implementing performance evaluation and reward systems. As Prendergast's (1999) agency model shows, these multiple objectives have major implications for the design and performance consequences of performance measurement and compensation plans—implications that should be factored into future empirical studies.

In addition to the problems noted above, the studies reviewed in this section highlight some of the limitations associated with the data sources commonly used in managerial accounting research. These limitations are found throughout empirical managerial accounting studies, but are most evident in this set of papers due to the larger volume of published research on these topics. The majority of studies rely on one of three sources for their samples: (1) publicly available information, (2) surveys conducted by third parties (e.g., consulting companies), and (3) surveys conducted by the researchers. Studies focused on the choice of performance measures in incentive plans, for example, typically use public disclosures on top executive compensation (which are legally required in proxy statements) or data collected by consulting firms. Both of these sources have limitations. By relying on proxy disclosures, compensation studies tend to place little emphasis on the methods used to reward lower-level employees, even though

these compensation practices may have a greater influence on firm performance than executive reward practices.

Another common problem with the use of public data sources is relatively weak independent or predictor variables. In many cases, proxies for the hypothesized predictors are only remotely related to the constructs of interest. For example, market-to-book ratios have served as proxies for growth opportunities, strategy, intangible assets, and information asymmetries, even though it is unclear exactly what this measure is capturing. Studies can also be forced to use measures that are not at the same unit of analysis as the hypothesized associations. Bushman et al. (1995), for example, use financial statement disclosures on the *firm's* geographical and product diversification to test models on *business unit* performance measurement practices. Similarly, Keating (1997) uses *industry-level* proxies for some of the hypothesized *divisional* performance measure determinants because these issues were not addressed in his original survey.

Survey data collected by third parties such as consulting firms are also subject to potential limitations. In most cases, there is no indication of the sample selection biases associated with these surveys. Studies rarely report the extent to which the survey responses are limited to clients of the consulting company conducting the survey, the overall response rate, or the biases in the types of responding organizations. Studies using third party data are also limited by the questions asked in the survey (which frequently have poor psychometric properties and are not be directly related to the variables of interest) and the lack of desired control variables (e.g., other organizational practices that may affect control system design or performance). Moreover, multiple indicators for each desired construct and multiple respondents for each question are often

unavailable, making it difficult to determine the resulting constructs' reliability and validity.

Surveys conducted by researchers are not immune to these problems. Young's (1996) critique of survey research in managerial accounting discusses a variety of methodological problems that are common in all survey research (e.g., response biases and construct reliability and validity). In addition, our review identified a number of limitations specific to managerial accounting studies. First, the surveys are often very narrow and ask few, if any, questions about organizational practices other than those being studied. But managerial accounting practices are rarely implemented in isolation from other organizational changes. As a result, correlated omitted variable problems are likely.

The survey questions often lack specificity. For example, many performance measurement studies simply ask respondents the extent to which their firm uses a specific measure, without specifying the decision context (e.g., compensation, capital justification, or operational reviews). This makes it difficult to determine whether the responses are consistent (e.g., one manager may answer with respect to compensation, another with respect to manufacturing performance reports) or to interpret the results.

Far too many surveys rely on respondents' perceptions of their firms' use of managerial accounting or other organizational practices, rather than asking for "harder" responses such as the percentage of employees actually using a given technique, the weight placed on various performance measures when computing bonuses, or the number of allocation bases used in the cost accounting system. This problem is compounded when the study also uses perceptions of organizational performance or success (e.g.,

asking respondents to rate their performance relative to competitors or relative to their own expectations). Regressing perceived performance on perceived accounting system uses or benefits is likely to yield highly biased results.

A final limitation in this set of papers is measuring the “match” or “fit” between a managerial accounting practice and the firm’s organizational environment when assessing performance consequences. The frameworks discussed in Section 2 contend that accounting and control practices must be aligned with the organization’s environment. However, managerial accounting theories and frameworks provide little guidance on the correct method to measure the “fit” between managerial accounting practices and other organizational characteristics. As a result, a variety of empirical methods have been used to measure these concepts, all of which have strengths and weaknesses. Perhaps the simplest technique is to estimate moderated regression models that include multiple interactions among the independent variables. However, this approach assumes a very specific functional form for the interactions, and is typically plagued by high levels of multicollinearity, making interpretation difficult.<sup>21</sup>

Cluster analysis has also been used to assess the complete “package” of accounting and control practices (e.g., Chenhall and Langfield-Smith, 1998; Ittner et al., 1999). Cluster analysis groups observations that are in close proximity in multi-dimensional space for a given set of variables. By incorporating multiple managerial accounting practices, the resulting clusters identify different “configurations” of overall accounting and control system design, which can then be related to organizational performance. Researchers using this approach argue that cluster analysis provides a “systems approach” for evaluating managerial accounting practices. However, the

selection of the “correct” number of clusters is more art than science, and the resulting clusters are often difficult to interpret. Moreover, it is impossible to determine which of the multiple attributes and interactions captured in the clusters actually drive any observed performance differences.

Other researchers measure system “misfit” as the deviation from some “optimal” system design. This approach requires the researcher to predict the “optimal” practices for the organization using some method such as regression analysis, and then use the residuals for each observation to estimate the distance the organization is from the estimated “optimal” practice. An alternative approach is to measure the deviation in a set of practices from the practices used by the highest performing organization, with the level of “misfit” operationalized using a summary measure such as Euclidean distance (e.g., Selto et al., 1995). The primary drawback of these approaches is the need to determine appropriate benchmark models for the choice of accounting and control practices (i.e., correct functional form for the prediction models, selection of appropriate contingency variables, and the accuracy of the assumption that observed practices, on average, are “optimal”). Further theoretical and methodological advances are needed to determine which of the many approaches for measuring “fit” is most appropriate.

#### *4.4.5 Research Opportunities*

Notwithstanding the limitations discussed above, our limited understanding of the identification and justification of improvement opportunities, action plans, and investments raises a number of opportunities for research on the choice and performance consequences of these practices. One interesting topic is the role and benefits of “real option” techniques for investment justification. Dissatisfaction with discounted cash flow

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<sup>21</sup> See Hartmann and Moers (1999) for a critique of moderated regression analysis in budgetary research.

techniques has led to a growing literature focusing on the value of managerial flexibility in handling real asset investments, or “real options.” Trigeorgis and Kananen (1991), for instance, propose an options-based investment planning model that quantifies various strategic components of value, such as the flexibility embedded in real options, the synergy between groups of project taken simultaneously, and interdependencies among projects over time. Although Busby and Pitts (1997) find that decision-makers intuitively include real options thinking in some of their investment decisions, few firms have formal procedures for assessing these options. As more firms begin quantifying the value of real options, research can examine the valuation methods used and the applicability of the real option concept in different contexts.

The growing use of multiple financial and non-financial performance measures for decision-making and compensation purposes leads to questions about how measures defined in different dimensions (e.g., money, time, satisfaction survey scores, defect rates, etc.) should be combined to form an overall assessment. One possibility is to allow the decision-maker to subjectively decide the weights. However, subjective assessments are prone to a number of potential biases (Prendegast and Topel, 1993). An alternative is to combine the measures using a pre-determined weighting formula. Difficulties with this option include determining the weights to place on the individual measures, and preventing the game-playing associated with any explicit, formula-based rules (Kaplan and Norton, 1996). The growing emphasis on multiple measures for decision-making and compensation purposes makes the relative value of subjective versus formulaic evaluations an interesting research topic.

The benefits from including economic value measures in compensation plans is also an important issue. Although most value-based management advocates endorse the use of these measures at higher organizational levels, there is considerable debate as to their efficacy at lower levels. Stewart (1995), for example, asserts that the poor results from many EVA implementations are attributable to the fact that EVA use is not pervasive throughout the organization, especially for compensation decisions. Copeland et al. (1996), on the other hand, claim that lower-level managers should be evaluated and rewarded based on the specific financial and operational value drivers that are most closely tied to the managers' actions. Garvey and Milbourne (2000) argue that EVA-based compensation may be more beneficial when a company's EVA measures are more highly correlated with stock returns. Kaplan and Norton (1996), in turn, are unclear as to how the value drivers in the balanced scorecard should be used in compensation. Surveys suggest that VBM adopters are following a variety of compensation approaches (Ittner and Larcker, 1998a; KPMG Consulting, 1999), providing a natural opportunity to study the relative value of economic profit measures at various organizational levels and in different settings.

A final topic is the setting of performance targets.<sup>22</sup> As noted above, this is a critical but under-researched area of managerial accounting. This topic is especially important given the rising use of non-financial measures, many of which are likely to be characterized by diminishing or negative returns at higher performance levels (e.g., Ittner and Larcker, 1998b). A survey of customer satisfaction measurement by Arthur

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<sup>22</sup> A related issue is the use and performance benefits of target costing practices in product development. Target costing is a method for designing products and services to simultaneously meet customer needs and achieve the company's profit targets. Despite considerable discussion of the benefits from target costing, Koga (1998a, 1998b) finds only mixed evidence that the use of target costing practices by Japanese camera



Anderson & Co. (1994), for example, finds that one of the most difficult problems in setting satisfaction goals is determining where these diminishing returns occur.

Researchers can make a significant contribution by providing evidence on the methods used to set financial and non-financial targets and the performance implications arising from these choices. Among the interesting research topics are the methods used to develop targets, the target's level of tightness, and the use and consistency of performance targets for different purposes (e.g., compensation, capital investments, identification of improvement opportunities, and planning). Figure 6, for example, shows wide differences in the extent to which financial service firms establish formal goals for different performance categories, with particularly big differences between financial and non-financial measures.

The *methods* used to establish goals for different types of measures can also vary. Table 4 illustrates this variety using survey data on non-management incentive plans.<sup>23</sup> The responses indicate that more than one method is often used to establish goals for a given type of measure, with the primary goal setting method varying by measure. In some cases, no targets are established; 11.4 percent of the respondents to this survey set no goal for financial performance and 30.3 percent set no goal for attendance. The wide variety of practices provides an excellent opportunity to increase our understanding of target setting methods and consequences.

\*\*\* Table 4 about here \*\*\*

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manufacturers is associated with lower product development engineering hours and subsequent product manufacturing costs.

<sup>23</sup> Access to the confidential data on non-management incentive plans reported in Table 4 was provided by the Consortium for Alternative Reward Strategies Research.

#### *4.5 Evaluating Performance and Reassessing Organizational Objectives and Plans*

The final two steps in the VBM framework involve the evaluation of performance and the reassessment of organizational objectives, plans, and strategies when results do not meet expectations. The few related accounting studies on these issues indicate that the benefits from formal review and reconciliation procedures vary depending on a variety of contextual factors.

Smith's (1993) examination of investment monitoring systems, for example, finds that firms that employ these systems exhibit a positive relation between investment abandonments and performance, while firms without these systems exhibit a negative relation. Myers et al. (1991) also find that the initiation of sophisticated post-auditing procedures by firms using sophisticated capital justification techniques has significant, positive effects on firm performance. However, Gordon and Smith (1992) find that performance is contingent on an appropriate "match" between post-audit sophistication and firm-specific variables such as the level of asymmetric information, capital intensity, capital expenditures, and insider ownership.

Strategic control system studies indicate that the advantages of formal processes for determining whether a strategy is being implemented as planned and assessing whether the strategic results are those intended can actually be counter-productive in some environments. Field studies by Lorange and Murphy (1984) and Goold and Quinn (1993) indicate that many firms believe that informal strategic control practices are more appropriate in rapidly-changing environments because of difficulties pre-specifying the appropriate strategic action plans, targets, and performance measures. Consistent with

these claims, Fiegeneger (1997) finds that the perceived effectiveness of strategic control systems is higher in firms following a cost leader strategy than in those following a differentiation strategy. Moreover, tight strategic controls increase the perceived effectiveness of strategic control systems in cost leader firms, but hinder their effectiveness in differentiators. Similarly, Ittner and Larcker (1997) find that the development of formal strategic action plans and formal monitoring of strategic progress by executives and the board of directors is associated with *lower* performance in the dynamic computer industry, and *no* statistical impact in the automotive industry.

#### *4.5.1 Research Opportunities*

Given the mixed results in these studies, an interesting research issue is the applicability of the value-based management concept and related frameworks such as the balanced scorecard process. Although these frameworks typically are described as being universally applicable, the strategic control system studies provide evidence that these concepts may be more beneficial in some competitive and strategic settings than in others. Goold and Quinn (1993), for example, discuss a number of factors that influence the choice of strategic control practices, including the length of time-lags between actions and results, the potential for linkages with other businesses in the firm's portfolio, the level of risk, and the sources of competitive advantage in the business. Researchers can investigate whether these and other factors actually influence the choice of and benefits from formal strategic control systems.

A related issue is the role of formal versus informal controls in implementing and monitoring value-based management systems. The negative results for some of the formal strategic control practices in the studies discussed above suggest that these

practices can actually be detrimental. Enhanced understanding of the applicability and performance consequences of formal versus informal control systems in different settings can make a significant contribution to the managerial accounting literature.

Researchers can also determine whether all six steps in the VBM process are needed to achieve superior performance. Studies to date have examined only one or a few of the links in the process, and provide no evidence on whether the broad set of VBM practices adds greater value jointly than individually. Progress in understanding the costs and benefits of managerial accounting practices such as these will require a much broader perspective that captures the many interdependencies among these practices.

Finally, the question arises as to whether the “new” value-based management techniques, including related methods such as activity-based costing, the balanced scorecard, and EVA, are fundamentally different than (or superior to) traditional accounting and control practices or are merely fads promoted by management consultants and other third-parties. Malmi (1999) refers to changes in managerial accounting practices that are pushed by consultants, business schools, and mass-media publications as “supply-side” accounting innovations. His study of activity-based costing diffusion in Finland indicates that the initial ABC adopters implemented the systems in order to improve efficiency and effectiveness. However, later adopters tended to implement ABC for “fashion” or “fad” reasons encouraged by the widespread promotion of ABC by third-parties. Additional insight into the adoption, use, and performance implications of “supply-side” accounting innovations can make a significant contribution to our understanding of managerial accounting practice.

## 5. Future Directions

This section presents our views on the steps needed to push managerial accounting research forward and enhance a study's probability of acceptance in a leading accounting journal. In particular, we discuss some of the approaches available to address common problems encountered in managerial accounting research, including motivation and hypothesis development, sample selection and construct measurement, model specification, and endogeneity.

### *5.1 Motivation and Hypothesis Development*

For managerial accounting research to advance, researchers must move away from motivating their papers based on enthusiasm in the business press, and must indicate why the practices or research settings are interesting from a theoretical standpoint. Consider the current enthusiasm for e-commerce research. Unless researchers can articulate how this industry contributes to theory development or testing, e-commerce studies are unlikely to have a lasting impact on accounting research.

In many cases, economic theories cannot fully explain the observed practices. Instead, researchers must draw upon a broader set of disciplines when developing and testing hypotheses. Merchant et al. (2000), for example, provide an insightful review of behavioral and economic approaches to compensation research, and the limitations that arise when these multiple perspectives are ignored.

### *5.2 Sample Selection and Construct Measurement*

As discussed in Section 3.4.3, commonly used data sources such as public disclosures, surveys, and third party studies each have strengths and weaknesses. Researchers must trade off the data sources' relative strengths and weaknesses when

examining a given research question by considering issues such as sample size, data quality, and data collection costs. More importantly, researchers must attempt to minimize the weaknesses as much as possible. For example, an extensive literature on survey research methods exists that can be used to improve the quality of survey-based accounting studies. Survey researchers can also include more questions requiring “hard” responses, rather than relying solely on perceptual measures.

Multiple data sources or research methods (e.g., data analysis, interviews, and experiments) can be used to provide a consistent body of evidence that increases the reader’s confidence in the results.<sup>24</sup> Ittner and Larcker (1998b), for example, use customer-level data from a telecommunications firm, branch-level data from a bank, and publicly available firm-level data to examine the relation between customer satisfaction measures and future financial performance. Despite the substantial differences in the three data sets, the analyses yield similar results, suggesting that the findings are not driven by data limitations or sample biases.

In a similar vein, survey data can be combined with hard performance data from publicly available sources to enhance the credibility of performance tests. For example, detailed performance data are publicly available for many industries such as banks and hospitals. Growth in the internet is making even larger volumes of financial and non-financial performance data readily accessible to researchers. Replacing self-reported organizational success measures with actual performance results can help increase the reputation of survey-based research in the accounting community.

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<sup>24</sup> See Birnberg et al. (1990) for a discussion of the advantages of multiple research methods in empirical managerial accounting research.

Greater use of detailed data from a single or small number of organizations is also recommended. Although small sample studies will always be subject to complaints about their generalizability, such studies may provide the only means for obtaining the quantity and level of data needed to answer many managerial accounting research questions. Excellent examples of small sample empirical studies in managerial accounting include Merchant and Manzoni (1989), Anderson (1995), and Banker et al. (1996; 2000).

No matter what data sources are selected, greater effort is needed to deal with measurement error. Typically, measurement error in the criterion (or dependent) variable leads to reduced statistical power for hypothesis testing, whereas measurement error in the set of (correlated) predictor (or independent) variables leads to inconsistent parameter estimates with a bias that generally is difficult to sign. Some managerial accounting research attempts to demonstrate the psychometric properties of the measures used for hypothesis testing (e.g., reliability and construct validity).<sup>25</sup> The most common approach is to use a weighted composite of multiple measures for each theoretical construct, after demonstrating that the selected measures are unidimensional via principal component analysis and have a sufficiently high Cronbach alpha (see Nunnally [1967] for a discussion). The primary assumption of this approach is that a weighted combination of related measures will have lower measurement error than any individual measure (i.e., exhibit higher reliability).

Another approach that can deal with measurement error and provide evidence on construct validity (i.e., whether the indicators actually measure what they purport to

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<sup>25</sup> The least sophisticated approach is to use a single indicator for each theoretical construct. Unless the researcher is very sure that the observed indicator measures the theoretical construct without error (undoubtedly a very rare occurrence), this approach will almost always be susceptible to inconsistent parameter estimates.

measure) is latent variable models. Two basic types of latent variable models have been used in accounting research: maximum likelihood common factor models (see Lambert and Larcker [1987] for an application) and partial least squares models (see Ittner et al. [1997] for an application). Each method can provide hypothesis tests using latent variable estimates that have reasonable reliability and construct validity, thereby mitigating the inconsistency in parameter estimates from individual variables with considerable measurement error. Moreover, sophisticated latent variable models can incorporate simultaneous equation specifications, some time series aspects, and interactions among the latent variables (Ping, 1996; Li et al., 1998).

### *5.3 Model Specification*

A key to improving managerial accounting research is better model specification. Although model specification should be driven by the theory being tested (Luft and Shields, 2000), relatively few studies articulate this linkage. Advances in empirical managerial accounting research not only require these linkages to be made explicit, but also require researchers to address three major econometric issues: (1) endogeneity, (2) simultaneity, and (3) functional form. We discuss these issues in the following sections.

#### *5.3.1 Endogeneity*

One key limitation in most empirical research is the endogeneity of the predictor (or independent) variables.<sup>26</sup> Endogeneity is caused whenever a predictor is also a choice variable that is correlated with the random error in the structural model. This misspecification causes the parameter estimates to be inconsistent, which renders the

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<sup>26</sup> Interestingly, critiques of the managerial accounting literature seem to be much more focused on endogeneity than other areas of empirical accounting research (e.g., capital markets work). However, the discussion of endogeneity is equally relevant to any type of quasi-experimental research, and is not solely a managerial accounting limitation.



interpretation of the model and hypothesis tests problematic. The econometric solution to endogeneity is using a method such as two-stage procedures that rely on instrumental variables to generate predicted variables that are uncorrelated with the error term.<sup>27</sup> Unfortunately, instrumental variables are very difficult to identify for most managerial accounting research. Since many organizational choices are interrelated, it is often hard to identify exogenous instruments that apply to one organizational choice and not to another. Even in studies that adopt two-stage procedures (e.g., Keating, 1997; Holthausen et al., 1995), the selected “instruments” also appear to be choice variables (e.g., “instruments” such as the investment opportunity set, as measured by the market-to-book ratio, are almost certainly endogenous). Thus, regardless of authors’ claims or the apparent sophistication of the methods used in the study, it is an open question as to whether the typical application of instrumental variable estimation methods causes more problems than it solves.

Another problem with this econometric approach is that the explanatory power from the regression of the endogenous variable on all (assumed) exogenous variables is frequently quite low. As discussed by Nelson and Startz (1990) and Bound et al. (1995), modest levels of explanatory power produce a variety of undesirable econometric properties. In particular, the instrumental variable estimates are biased in the same direction as the OLS estimates. Thus, although the “textbook solution” to endogeneity is known, the practical application of instrumental variable estimation to managerial

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<sup>27</sup> Many alternative estimation techniques are available in addition to two-stage least squares (e.g., three-stage least squares or maximum-likelihood methods). Given the instrumental variables, two-stage least squares is simple to implement and has a variety of advantages relative to more complicated methods (e.g., Challen and Hagger, 1983).

accounting research is problematic and is likely to produce misleading statements about the researcher's ability to address the endogeneity problem.

One particularly difficult endogeneity problem arises when the researcher wants to assess whether some managerial accounting choice is associated with improved organizational performance. As discussed in Demsetz and Lehn (1985), if *all* organizations in the sample are optimizing with regard to the accounting system choice, there should be no association between organizational performance and the observed (endogenous) choice, once the exogenous determinants of the choice are controlled in the structural model. Under this (rather extreme) scenario, empirical researchers should not even attempt to explain organizational performance because any statistically significant coefficient on the managerial accounting choice will only occur because of measurement error, misspecification of functional form, inadequate set of exogenous controls, etc. Taken to the extreme, managerial accounting researchers using secondary data should never use performance as the dependent or criterion variable because the results are not interpretable due to econometric problems caused by endogeneity.<sup>28</sup>

From a real world standpoint, it is difficult to believe that the statement “everybody optimizes all the time” characterizes actual managerial accounting practice.

As Milgrom and Roberts (1992, p. 43) note:

Paradoxically, the very imperfections in the rationality of people and in the adaptability of organizations denied by many simple economic theories are necessary in proving that rationality-based theories are descriptively and prescriptively useful. With perfect rationality, one would rarely expect to observe two organizations in substantially the same circumstances making substantially different choices, so there would be no possibility of testing what kinds of organizations perform better. ... A more defensible position ... is that people

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<sup>28</sup> This appears to be a very common critique by reviewers in the managerial accounting area. In many cases, this critique is deemed a “fatal” flaw of the research, and causes the paper to be summarily rejected.

learn to make good decisions and that organizations adapt by experimentation and imitation, so there is at least “fossil evidence” available for testing theories.<sup>29</sup>

Since managerial accounting researchers are ultimately interested in providing at least some insight into which practices have favorable effects on organizational performance, one approach is to admit that at any given point in time, a cross-sectional sample (such as that typically used in managerial accounting research) will be composed of organizations that vary with respect to the optimal level of practice adoption. As Milgrom and Roberts (1992) suggest, all organizations may be dynamically learning and moving toward the optimal level, but a cross-sectional sample will consist of observations that are distributed around the optimal choice. The observed cross-sectional variation in practices provides a means to assess the performance consequences of managerial accounting choices.

For example, assume that the research question of interest is whether activity-based costing improves firm performance. In addition, assume that the percentage of operations using activity-based costing (ranging from zero to 100 percent) is measured for a cross-section of firms. This analysis can be conducted in two steps. First, the researcher can hypothesize and estimate a model for the choice of a managerial accounting practice (e.g., activity-based costing is commonly hypothesized to be related to product mix, competition, and other determinants). This model is assumed to be the same for each firm, exhibits the correct functional form, has predictor variables that are measured without error, and includes all relevant (exogenous) predictor variables. The residuals for each observation (either positive or negative) estimate the distance the firm is off the systematic model describing “optimal” practice. Second, firm performance is

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<sup>29</sup> Similar ideas have been advanced in the managerial accounting literature. See, for example, Dunk

regressed on the absolute value of these residuals (or perhaps separately for positive and negative residuals if the slope coefficients are expected to be different). If activity-based costing affects firm performance and firms (on average) have optimally chosen their cost systems, the coefficient on the absolute value should be negative (i.e., either over-investing or under-investing in activity-based costing is costly for the firm).

#### *4.3.2 Simultaneity*

A related issue is the simultaneous choice of managerial accounting and other organizational attributes. In theory, organizations should simultaneously select (or match) their managerial accounting system, organizational design, compensation system, and other related process and structural aspects of the firm (e.g., Otley, 1980; Milgrom and Roberts, 1995; Brickley et al., 1997a). However, most of the reviewed work examines these issues by arbitrarily selecting one construct as endogenous (i.e., the dependent variable) and the remaining constructs as exogenous (i.e., the independent variables). Alternatively, the few attempts to estimate a non-recursive structural model simply assume that the instruments needed to identify the system (i.e., satisfy the rank and order conditions) are adequate. Unfortunately, as discussed above, many of these “instruments” do not seem to be exogenous variables that are uncorrelated with the error terms in the system of equations. Nevertheless, the use of simultaneous equation approaches to test the theoretical models of managerial accounting can alleviate some of the simultaneous equation bias. Moreover, although the philosophical basis of causality is problematic in a cross-sectional setting where the analysis is based solely on the correlation (or covariance) matrix, structural models involving simultaneous equations

allow the researcher to assess which hypothesized causal model is actually consistent with the observed data.

#### *4.3.3 Functional Form*

Managerial accounting theories and frameworks often contend that the relations among accounting and control practices, other organizational design choices, and performance can be characterized by complex interactions among the practices and non-linearities (e.g., the costs from more elaborate managerial accounting systems may exceed the benefits at higher levels of system complexity). This is particularly true of the frameworks discussed in Section 2, which argue that accounting and control practices must “match” or “fit” the organization’s environment.

In contrast, the functional form of most prior work is generally a simple linear structure, typically with few if any interactions among the independent variables.<sup>30</sup> Although a linear structure is straightforward to interpret, it may not be sufficient to capture the complex nature and associated performance consequences of many managerial accounting problems. For example, it would be useful to know if managerial accounting practices have the same relation with organization performance over the entire variable range (i.e., are there backward bending portions of the function?). Given our limited theoretical understanding of the appropriate functional form of structural models related to managerial accounting practices, it seems incumbent on researchers to entertain alternative specifications and to identify the form consistent with the observed data.

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<sup>30</sup> Luft and Shields (2000) provide an excellent review of the functional forms used in empirical managerial accounting research.

One (exploratory) technique that can detect nonlinearities is additive nonparametric regression (described as “modern regression methods” in *Splus*, 1991, chapter 18; Tibshirani, 1988). Nonparametric regressions use a variety of smoothing procedures to flexibly model additive nonlinear relationships between the predictors and the criterion (or dependent) variable. Whereas linear models assume that the criterion variable is linear in each predictor, additive models assume only that each predictor affects the criterion in a smooth way (see Ittner and Larcker [1998b] for an accounting application). An advantage of this general approach is that linear structures will be observed in the statistical and graphical analysis only if they are appropriate (i.e., this approach will not force the researcher to adopt a complex model when it is not appropriate).

Another promising exploratory technique for dealing with both higher-order interactions and nonlinearities is recursive partitioning (e.g., Breiman, 1984; Clark and Pregibon, 1992). Recursive partitioning attempts to explain the variation in the criterion variable by estimating a sequence of partitions of the predictor variables. At each step, the technique splits a subset of the sample into groups by selecting and partitioning the predictor variable that most improves the homogeneity of the resulting groups. As the splitting continues, this method generates a tree-like structure of sequential nodes and branches. For example, the first split in the tree may indicate that the variable that explains the most variance in manufacturing plant performance is the use of activity-based costing, with plants in the two upper quartiles of ABC usage displaying the highest results. However, within the upper quartiles, the splits may indicate that results are enhanced even further when ABC is accompanied by contingent compensation, but are

reduced when the plant does not allocate decision rights to production workers. In this way, recursive partitioning has the ability to detect complex, higher-order interactions that are virtually impossible to hypothesize in an *a priori* manner. The resulting model can also be used to assess the likely nonlinear combinations of predictor variables that yield the greatest performance effects (see Ittner et al. [1999] for a managerial accounting application).

Finally, dynamic aspects of managerial accounting practices largely have been ignored in prior studies. Many argue that an organization's environment is best understood as a highly interdependent system, as opposed to a simple recursive causal model. For example, important parameters in one part of the performance model can change in response to shifts in other parts of the organization's internal and external environment. Feedback loops among parameters can also exist. These issues are almost impossible to examine in a regression framework, and generally require some type of system dynamics method (e.g., Forrester, 1961; Senge, 1990). An excellent example of a system dynamics application in empirical research is the analysis of the performance effects of total quality management at Analog Devices (Sterman et al., 1997). It would seem almost impossible to understand the paradox between significant quality improvements and substantial declines in financial performance experienced by Analog Devices without closely examining the dynamic, interrelated organizational processes using methods such as system dynamics. The use of these procedures in managerial accounting research appears very promising.

## 6. Conclusions

The objectives of this paper are three-fold: (1) to critically review existing empirical research in managerial accounting, (2) to highlight some of the methodological shortcoming in these papers, and (3) to offer suggestions for future research. We conduct our review within the context of a value-based management framework that incorporates many of the concepts contained in other conceptual models such as contingency theories, economics-based organizational design frameworks, and the balanced scorecard process. Although the majority of empirical studies support the associations proposed in these models, our review also highlights a number of gaps and inconsistencies, providing natural opportunities for empirical research.

A final observation from our review is the lack of integration between financial and managerial accounting research. With the possible exception of compensation studies, accounting researchers have treated these fields as independent, even though it is likely that these choices do not stand alone. For example, the value-based management literature argues that the value driver analysis should not only influence the choice of action plans and the design of control systems, but should also affect external disclosure requirements (e.g., Black et al., 1998; KPMG Peat Marwick, 1999). This claim is consistent with calls in the financial accounting community for greater disclosure of information on key value drivers (e.g., American Institute of Certified Public Accountants, 1994; Wallman, 1995). Without greater integration of financial and managerial accounting research, our understanding of the choice and performance implications of internal and external accounting and control systems is far from complete.



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**Table 1**

Correlations among strategy proxies for 148 financial service firms. Pearson correlations above the diagonal and Spearman correlations below. Two-tailed p-values in parentheses.

	<b>FLEXIBLE</b>	<b>INNOV</b>	<b>PREDICT</b>	<b>BTOM</b>
<b>FLEXIBLE</b>	1.000	0.499 (0.000)	0.130 (0.118)	-0.052 (0.534)
<b>INNOV</b>	0.490 (0.000)	1.000	0.140 (0.090)	-0.115 (0.170)
<b>PREDICT</b>	0.109 (0.188)	0.135 (.102)	1.000	-0.082 (0.328)
<b>BTOM</b>	-0.084 (0.314)	-0.040 (0.634)	0.055 (0.516)	1.000

BTOM equals the firm's book-to-market ratio, commonly used as an inverse measure of growth opportunities or innovation strategies. Book-to-market data are obtained from Compustat. Other data are gathered from a survey of senior financial service executives during the fourth quarter of 1999. FLEXIBLE, INNOV, and PREDICT are developed from principal components analysis of 11 questions on the firms' strategies and competitive environment. FLEXIBLE equals the average standardized response to four questions asking the respondent's agreement with the statements "We respond rapidly to early signals of opportunity in our market," "We have greater flexibility to respond to changes in our environment than our competitors," "We have the ability to adjust capacity within a short period of time," "we have the ability to change product or service offerings rapidly" (scales ranging from 1 = strongly disagree to 6 = strongly agree). INNOV equals the average standardized response to four questions asking the respondent's agreement with the statements "We offer a more expanded range of products and services than our competitors," "We are first to market with new products or services," "We respond rapidly to early signals of opportunity in our market," and "We expect most of our future growth in profits to come from our new product and service offerings." PREDICT equals the average standardized response to three questions asking the respondent's agreement with the statements "We are most active in developing the markets we currently serve, rather than entering new markets with our products or services," "We operate in markets for our products or services that are highly predictable," and "It is easy to forecast how actions of competitors will affect the performance of our organization." One question asking whether the firm is more cost efficient than its competitors did not load greater than 0.40 on any factors and is excluded from the analysis.

**Table 2**

Spearman correlations between the organizational strategy variables and perceived value drivers in 148 financial service firms.<sup>a</sup>

	Strategy			
	FLEX	INNOV	PREDICT	BTOM
<b>Value Drivers:</b>				
Financial	0.074	0.021	0.111	-0.080
Customer	0.037	0.174**	0.142*	0.060
Employee	0.247***	0.337***	0.142*	0.041
Operational	0.069	0.12	0.184**	0.140*
Quality	0.191**	0.198**	0.149*	-0.030
Alliances	0.231***	0.258***	0.041	0.132
Suppliers	0.182**	0.299***	-0.014	-0.023
Environmental	0.119	0.146*	0.144*	0.104
Innovation	0.222***	0.384***	0.033	0.138*
Community	0.121	0.127	0.173**	-0.136

a. \*\*\*, \*\*, \* = statistically significant at the 1%, 5%, 10% levels (two-tailed), respectively.

See Table 1 for the definition of the strategy variables (FLEX, INNOV, PREDICT, and BTOM) and Figure 4 for the definition of the value driver categories (Financial, Customer, Employee, Operational, Quality, Alliances, Suppliers, Environmental, Innovation, and Community).



**Table 3**  
**The reasons for implementing performance evaluation systems, non-management incentive plans, and stock option plans<sup>a</sup>**

*Panel A:* The relative use of performance evaluations for career development and compensation (1 = exclusively to develop careers, 4 = equally to develop careers and determine compensation, 7 = exclusively to determine compensation)

*Percentage of respondents providing the following scores:*

1	1.0%
2	2.0%
3	13.1%
4	45.3%
5	25.2%
6	11.3%
7	2.0%

*Panel B:* The importance of possible reasons for adopting non-management incentive plans (% of respondents).

	No importance <b>1</b>	<b>2</b>	Moderate importance <b>3</b>	<b>4</b>	High importance <b>5</b>
Enhance communication of unit objectives	12.5	8.0	20.0	27.4	32.0
Encourage intrapreneurship	29.3	14.8	28.3	17.7	9.9
Foster teamwork	8.8	4.5	16.3	30.0	40.5
Improve morale/employee relations	8.9	8.9	25.4	32.3	24.4
Better pay-performance linkage	10.5	4.3	19.0	28.2	38.0
Reduce entitlement mentality	31.5	13.9	20.6	21.1	12.9
Make labor cost more variable with organizational performance	25.2	13.0	19.6	24.7	17.4
Become more competitive in total compensation	28.8	19.9	21.1	17.3	12.9
Provide method to allocate awards to high performing individuals/ teams	49.0	9.1	13.9	13.0	15.0
Assist in recruiting	40.1	22.0	21.2	11.1	5.7
Improve employee retention	30.4	15.1	26.0	19.7	8.8
Upgrade quality of workforce	31.6	13.5	27.8	18.0	9.1
Improve business performance and profitability	4.2	3.0	9.9	26.3	56.7

**Table 3 (continued)**

*Panel C: Mean relative rankings of the reasons for adopting stock option plans in high technology firms.<sup>b</sup>*

Retain employees	90.50
Provide competitive compensation	74.75
Attract employees	67.22
Link individual to company performance	53.58
Reward past contributions	36.96
Encourage stock ownership	30.29
Reward project milestones or goals	27.61

<sup>a</sup>. Survey data on performance appraisals were provided by the consulting firm Watson Wyatt. Data on non-management incentive plans were provided by the Consortium for Alternative Reward Strategies Research. The consulting firm iQuantic provided data on stock option plans in high technology companies.

<sup>b</sup>. Respondents were asked to rank these objectives and to give the same ranking to objectives with equal importance. The responses were recoded so that a score of 100 would be achieved if an item was ranked most important by all companies.

**Table 4**

Methods for developing baselines or goals for the performance measures used in non-management incentive plans. The table reports the percent of respondents who use the measure and develop baselines or goals using that method.<sup>a</sup>

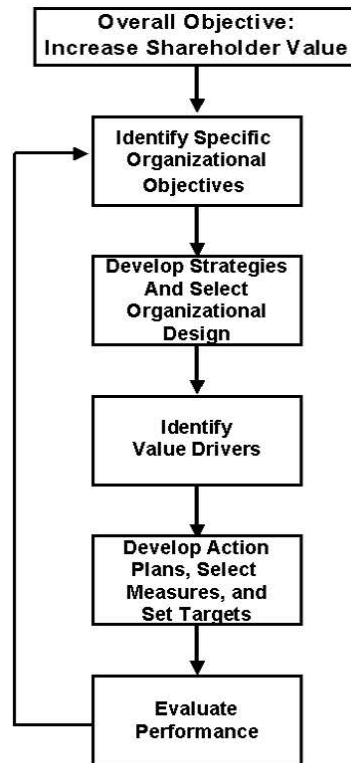
	Type of Measure <sup>b</sup>						
	ACCT	PROD	QUAL	SAFETY	ATTEND	COST	VOLUME
Historical results	52.2	76.4	67.4	66.2	35.9	59.1	61.7
Business plan	42.0	17.5	17.4	17.5	21.3	41.3	32.6
Benchmarking	13.2	15.6	15.3	18.8	13.4	10.4	n.a. <sup>c</sup>
Engineered standard	n.a.	15.3	5.3	4.5	n.a.	3.1	4.7
Government standards	0.5	n.a.	3.2	7.1	n.a.	1.5	n.a.
Customer satisfaction surveys	n.a.	n.a.	27.2	n.a.	n.a.	n.a.	n.a.
None	11.4	2.1	3.5	9.0	30.3	6.8	4.7

<sup>a</sup>. The data in the table were obtained from surveys conducted by the Consortium for Alternative Reward Strategies Research.

<sup>b</sup>. ACCT = accounting measures, PROD = productivity measures, QUAL = quality and customer measures, SAFETY = safety measures, ATTEND = attendance measures, COST – cost reduction measures, and VOLUME = volume measures.

<sup>c</sup>. n.a. denotes responses that were not allowed in the survey instrument.

**Figure 1**  
**Value-Based Management Accounting Framework**



**Figure 2**  
**Adaptation of the Brickley, Smith, and Zimmerman (1995)**  
**Model of Organizational Architecture**

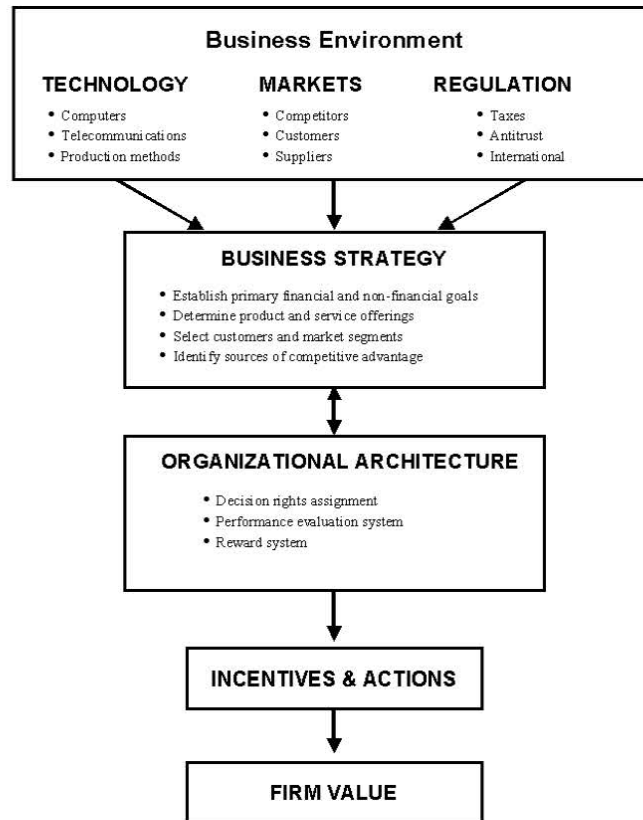
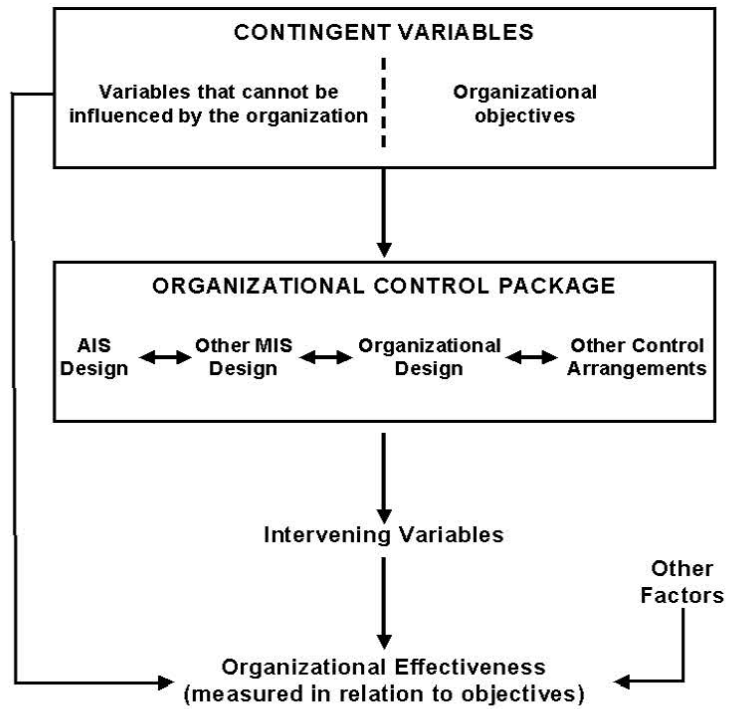


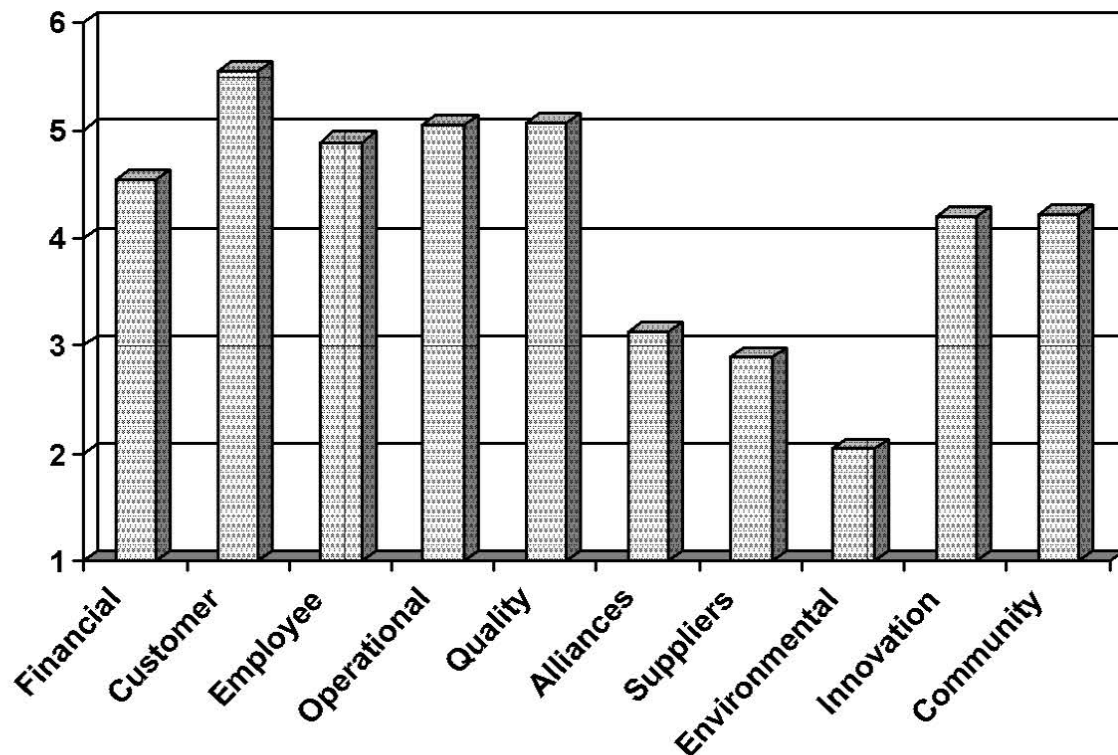
Figure 3  
Otley's (1980) Contingency Theory Framework



**Figure 4**

Mean Perceived Importance of Selected Performance Measurement Categories from a Survey of 148 Senior-Level Executives of Financial Service Firms Conducted During the Fourth Quarter of 1999

**Perceived Importance<sup>a</sup>**



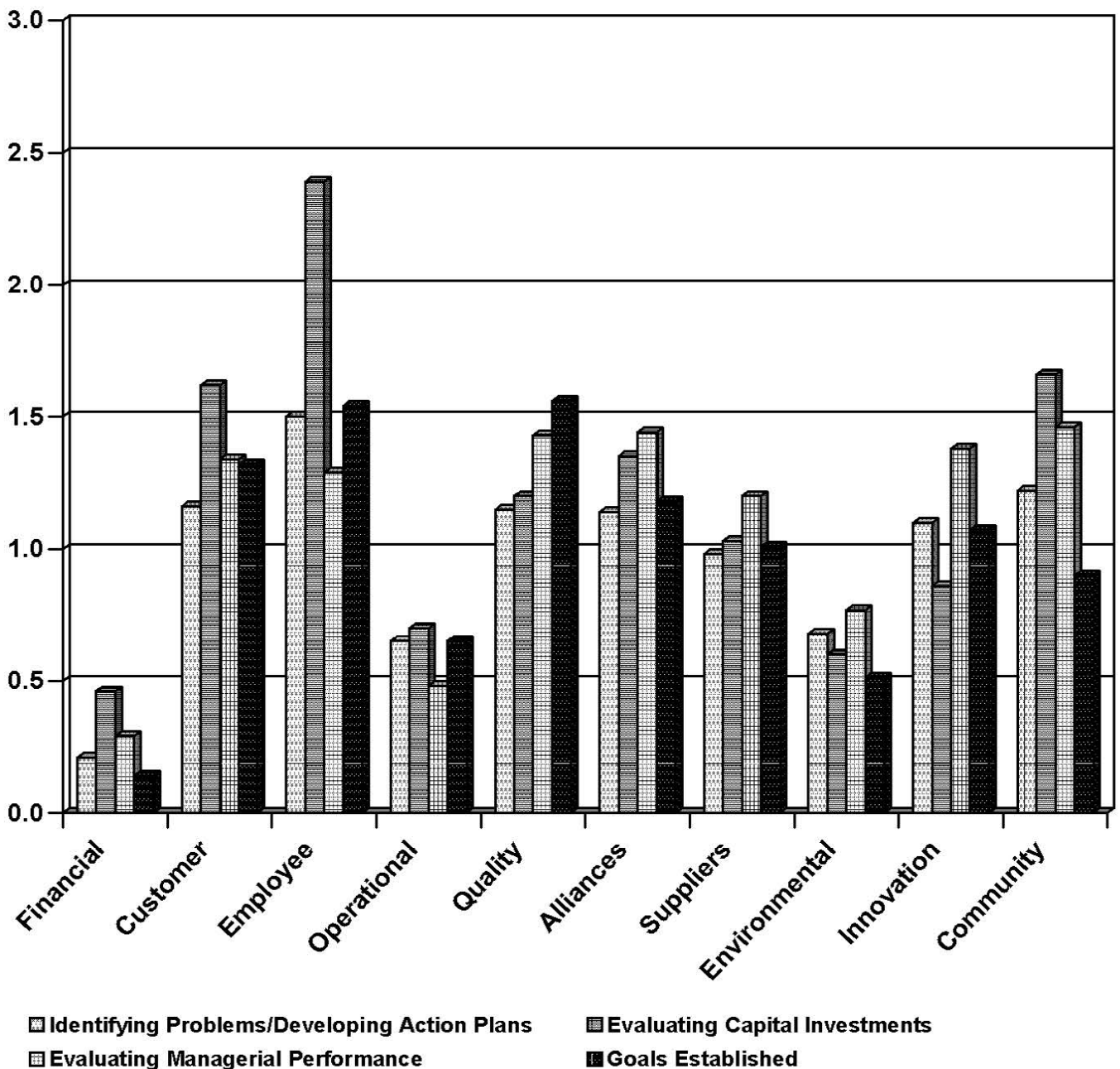
<sup>a</sup>The respondents answered the following question: "To what extent do you view the following categories of performance measurement as important drivers of long-term organizational success?" Perceived importance was measured using a seven-point scale, with zero labeled as not applicable to our organization, one labeled as not at all important, and six labeled as extremely important. For purposes of coding, a response of zero (i.e., not applicable) was treated as equivalent to a response of one (i.e., not at all important).

The precise definitions for each performance category provided to the survey respondents were: Financial - short-term financial performance (e.g., annual earnings; return on assets), Customer - relations with customers (e.g., market share; customer satisfaction; customer loyalty/retention), Employee - relations with employees (e.g., employee satisfaction; employee turnover; work force capabilities), Operational -- operational performance (e.g., productivity; on-time delivery; safety; cycle time), Quality - product and service quality (e.g., defect rates; refund/returns; quality awards), Alliances - alliance with other organizations (e.g., joint marketing; joint research and development; joint product design), Suppliers - relations with suppliers (e.g., on-time delivery; input into product/service design), Environmental - environmental performance (e.g., EPA citations; environmental compliance), Innovation - product and service innovation (e.g., new product development; product development cycle time), and Community - community (e.g., public image; community involvement).

**Figure 5**

Mean “Gap” Between Perceived Importance and Use of Selected Performance Measurement Categories from a Survey of 148 Senior-Level Executives of Financial Service Firms Conducted During the Fourth Quarter of 1999

Measurement “Gap”<sup>a</sup>





<sup>a</sup>Measurement “Gap” is the difference between the score for the perceived importance of each performance category and the score for the extent to which the performance category is used for internal decision-making or the score for whether formal strategic goals are established for each category.

For perceived importance, the respondents answered the following question: “To what extent do you view the following categories of performance measurement as important drivers of long-term organizational success?” Perceived importance was measured using a seven-point scale, with zero labeled as not applicable to our organization, one labeled as not at all important, and six labeled as extremely important. For purposes of coding, a response of zero (i.e., not applicable) was treated as equivalent to a response of one (i.e., not at all important).

For internal decision-making, the respondents answered the following three individual questions: “To what extent is information pertaining to the following categories used for identifying problems and improvement opportunities and developing action plans?; evaluating major capital investment projects?; and evaluating managerial performance? Usage was measured using a seven-point scale, with zero labeled as not applicable to our organization, one labeled as not used at all, and six labeled as used extensively. For purposes of coding, a response of zero (i.e., not applicable) was treated as equivalent to a response of one (i.e., not used at all).

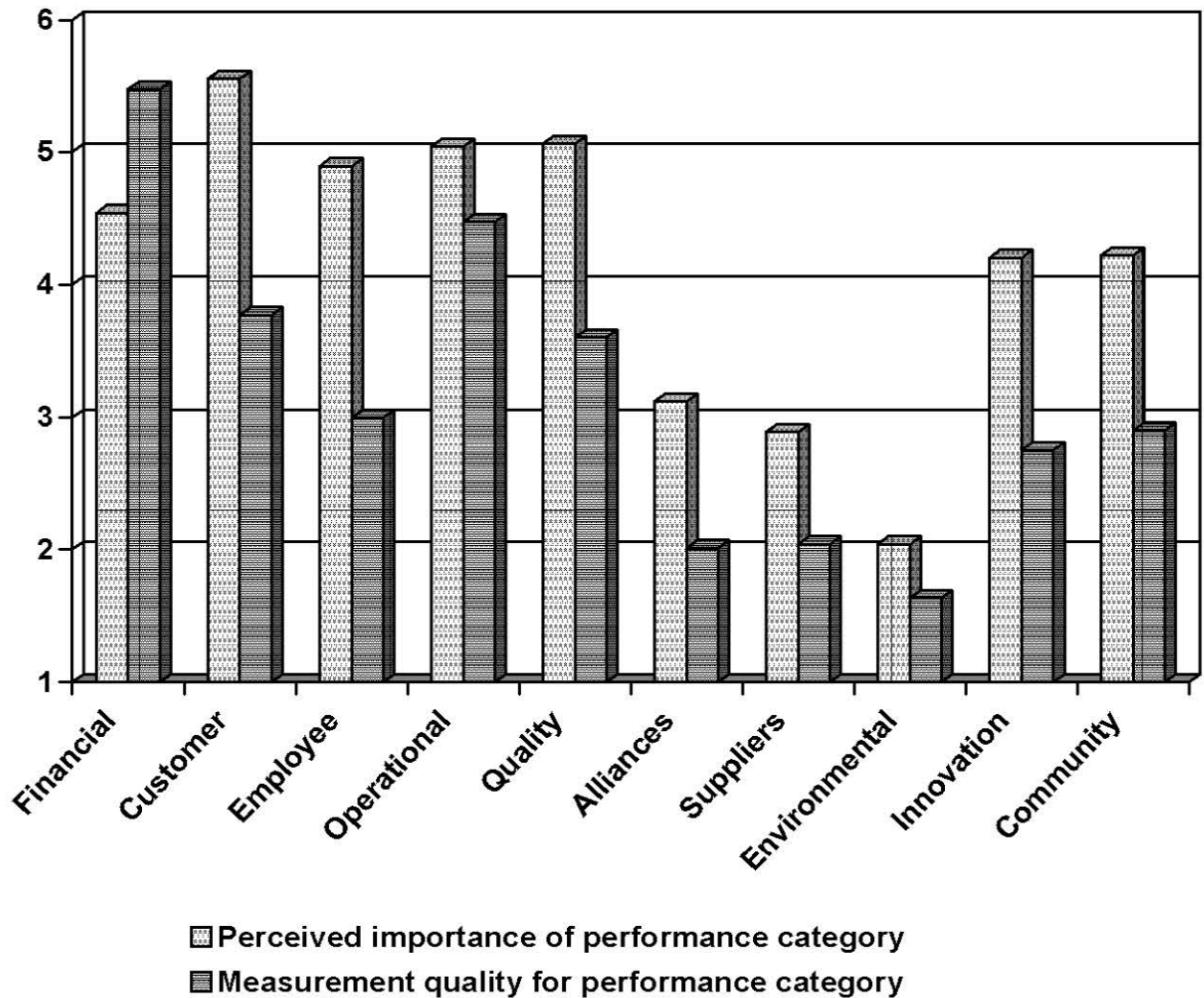
For goal setting, the respondents answered the following question: “To what extent has your organization established formal strategic objectives (or goals) for the performance categories?” Goal development was measured using a seven-point scale, with zero labeled as not applicable to our organization, one labeled as no goals established, and six labeled as explicit goals established. A response of zero (i.e., not applicable) was treated as equivalent to a response of one (i.e., no goals established).

A respondent organization is assumed to have a zero “gap” if the score for internal usage or goal setting is greater than or equal to the perceived importance score.

The precise definitions for each performance category provided to the survey respondents were: Financial - short-term financial performance (e.g., annual earnings; return on assets), Customer – relations with customers (e.g., market share; customer satisfaction; customer loyalty/retention), Employee – relations with employees (e.g., employee satisfaction; employee turnover; work force capabilities), Operational -- operational performance (e.g., productivity; on-time delivery; safety; cycle time), Quality – product and service quality (e.g., defect rates; refund/returns; quality awards), Alliances – alliance with other organizations (e.g., joint marketing; joint research and development; joint product design), Suppliers – relations with suppliers (e.g., on-time delivery; input into product/service design), Environmental – environmental performance (e.g., EPA citations; environmental compliance), Innovation – product and service innovation (e.g., new product development; product development cycle time), and Community – community (e.g., public image; community involvement).

**Figure 6**  
Mean Perceived Importance of Selected Performance Measurement  
Categories from a Survey of 148 Senior-Level Executives of Financial  
Service Firms Conducted During the Fourth Quarter of 1999

**Perceived Importance<sup>a</sup> / Measurement Quality<sup>b</sup>**



<sup>a</sup>The respondents answered the following question: "To what extent do you view the following categories of performance measurement as important drivers of long-term organizational success?" Perceived importance was measured using a seven-point scale, with zero labeled as not applicable to our organization,

one labeled as not at all important, and six labeled as extremely important. A response of zero (i.e., not applicable) was treated as equivalent to a response of one (i.e., not at all important).

<sup>b</sup>The respondents answered the following question: "How well does your organization measure information in the following categories?" Measurement quality was measured using a seven-point scale with zero labeled as not applicable for our organization, one labeled as extremely poor quality of measurement, and six labeled as high quality of measurement. A response of zero (i.e., not applicable) was treated as equivalent to a response of one (i.e., extremely poor quality of measurement).

The precise definitions for each performance category provided to the survey respondents were: Financial - short-term financial performance (e.g., annual earnings; return on assets), Customer – relations with customers (e.g., market share; customer satisfaction; customer loyalty/retention), Employee – relations with employees (e.g., employee satisfaction; employee turnover; work force capabilities), Operational -- operational performance (e.g., productivity; on-time delivery; safety; cycle time), Quality – product and service quality (e.g., defect rates; refund/returns; quality awards), Alliances – alliance with other organizations (e.g., joint marketing; joint research and development; joint product design), Suppliers – relations with suppliers (e.g., on-time delivery; input into product/service design), Environmental – environmental performance (e.g., EPA citations; environmental compliance), Innovation – product and service innovation (e.g., new product development; product development cycle time), and Community – community (e.g., public image; community involvement).