

# Measuring Organizational Performance: Towards Methodological Best Practice<sup>†</sup>

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*Organizational performance is one of the most important constructs in management research. Reviewing past studies reveals a multidimensional conceptualization of organizational performance related predominately to stakeholders, heterogeneous product market circumstances, and time. A review of the operationalization of performance highlights the limited effectiveness of commonly accepted measurement practices in tapping this multidimensionality. Addressing these findings requires researchers to (a) possess a strong theoretical rationale on the nature of performance (i.e., theory establishing which measures are appropriate to the research context) and (b) rely on strong theory as to the nature of measures (i.e., theory establishing which measures should be combined and the method for doing so). All management research on performance should explicitly address these two requirements. The authors conclude with a call for research that examines triangulation using multiple measures, longitudinal data and alternative methodological formulations as methods of appropriately aligning research contexts with the measurement of organizational performance.*

**Keywords:** *performance; profitability; empirical measurement; construct validity; organizational effectiveness*

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Organizational performance is the ultimate dependent variable of interest for researchers concerned with just about any area of management. Market competition for customers, inputs, and capital make organizational performance essential to the survival and success of the modern business. As a consequence, this construct has acquired a central role as the deemed goal of modern industrial activity. Marketing, operations, human resources (HR), and strategy are all ultimately judged by their contribution to organizational performance. Measuring it is essential in allowing researchers and managers to evaluate the specific actions of firms and managers, where firms stand vis-à-vis their rivals, and how firms evolve and perform over time. Its importance as the ultimate evaluative criterion is reflected in its pervasive use as a dependent variable. March and Sutton (1997) found that of 439 articles in the *Strategic Management Journal*, the *Academy of Management Journal*, and *Administrative Science Quarterly* over a 3-year period, 23% included some measure of performance as a dependent variable.<sup>1</sup> In contrast to the dominant role that organizational performance plays in management fields is the limited attention paid by researchers to what performance is and how it is measured.

The definition of *organizational performance* is a surprisingly open question with few studies using consistent definitions and measures (see Kirby, 2005). Performance is so common in management research that its structure and definition are rarely explicitly justified; instead, its appropriateness, in no matter what form, is unquestionably assumed (March & Sutton, 1997). It is sad that, 10 years after March and Sutton's call to virtue, these assumptions continue largely unquestioned. Reviewing the last 3 years of the journals examined by March and Sutton as well as the *Journal of International Business Studies* and the *Journal of Management*, we identified 213 papers—29% of the total published in those journals—that included organizational performance as a dependent, independent, or control variable (see the appendix). Table 1 summarizes the measurement of performance used in these papers. The measures ranged from an assortment of financial operating ratios (e.g., net profit after taxes [NPAT] and the return on equity [ROE]) to measures of successful outcomes (e.g., Food and Drug Administration [FDA] approvals and survivorship) to broad subjective perceptions of relative performance variously measured. Overall, across the 213 papers identified as including a performance variable, 207 different measures of performance were used. The diversity of approaches was further complicated by variation in the use of single, multiple, and aggregated measures. What stands out from this examination is the lack of clarity in the theoretical definition of performance and the absence of methodological consistency in the formulation of the construct(s) used. Together, these limitations make effective positive scientific comparisons between these papers difficult and normative recommendations hard to justify as having any degree of prescriptive validity.

Our review indicates that despite its recognized importance, researchers still pay little theoretical attention to, or display methodological rigor about, the choice, construction,

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**Table 1**  
**Measurement of performance 2005-2007 in leading academic management journals<sup>a</sup>**

	<i>AMJ</i>	<i>ASQ</i>	<i>JIBS</i>	<i>JOM</i>	<i>SMJ</i>	Total
Articles in period	188	49	157	120	208	722
Articles using a performance variable	45	9	39	22	98	213
Percentage using performance as a: <sup>b</sup>						
Dependent variable	73%	67%	62%	55%	72%	69%
Independent variable	9%	44%	18%	23%	21%	19%
Control variable	36%	11%	38%	55%	33%	36%
Source of data						
Survey only	22%	11%	33%	27%	19%	23%
Secondary only	53%	78%	54%	64%	60%	59%
Both	24%	11%	13%	9%	20%	18%
Operationalization <sup>b</sup>						
Objective	76%	89%	62%	59%	79%	73%
Subjective	22%	11%	36%	36%	22%	26%
Quasi-objective	9%	0%	10%	5%	5%	7%
Performance measures used <sup>b</sup>						
Accounting (objective)	47%	33%	49%	50%	60%	53%
Accounting (subjective)	7%	0%	18%	18%	11%	12%
Financial market (objective)	18%	22%	15%	14%	18%	17%
Financial market (subjective)	2%	0%	0%	0%	0%	0%
Tobin's <i>q</i> or other mixed measure	4%	11%	5%	9%	17%	11%
Reputation or perception of effectiveness (subjective)	11%	11%	23%	41%	16%	19%
Sales, market share, or related measure (objective)	24%	22%	15%	18%	9%	15%
Sales, market share, or related measure (subjective)	2%	0%	26%	14%	10%	11%
Survival	4%	22%	8%	9%	8%	8%
Number of measures						
Percentage using a single performance measure	60%	44%	33%	45%	52%	49%
Percentage where multiple measures were collected	40%	56%	67%	55%	48%	51%
Multiple measures used in:						
Multiple separate analyses	56%	80%	54%	58%	79%	67%
Aggregation (factor analysis)	17%	20%	38%	25%	21%	25%
Aggregation (averaging)	28%	20%	23%	33%	19%	23%
Percentage modeling longitudinal data	53%	67%	36%	32%	52%	48%

a. *Academy of Management Journal (AMJ)*, *Administrative Science Quarterly (ASQ)*, *Journal of International Business Studies (JIBS)*, *Journal of Management (JOM)*, and *Strategic Management Journal (SMJ)*.

b. Percentages may add up to > 100% due to multiple categorizations per article.

and use of the plethora of performance measures available to them. Our goal is to reignite the debate surrounding the meaning and measurement of organizational performance with particular emphasis on financial measures and the use of performance as a dependent variable.

This debate is critical, first, to update research thinking. Although several foundational reviews on measuring performance were published in the 1980s (e.g., Chakravarthy, 1986; Venkatraman & Ramanujam, 1986), the past 20 years have seen the advent of a greater number of performance measures and with a broader ambit (e.g., the triple bottom line) and important empirical and methodological developments that have yet to be comprehensively integrated.

The broadening of the domain of organizational performance has implications for both methodological practice and the relationship between academic research and management practice. Stated simply, we may not be measuring the performance to which managers are managing. For example, Boyd, Gove, and Hitt (2005) found that in the papers published by the four leading management journals from 1998 to 2000, performance was the most common dependent and in 38.1% of the cases it was measured using a single indicator. Only 19.6% of these studies used statistically constructed scales that allowed the measurement structure and error to be evaluated (Boyd et al., 2005). We find similar results with single indicators used in 49% of the papers we reviewed. The frequent use of single item measures indicates a continuing need to integrate methodological developments into practice.

Second, the debate is critical to establish the relevance and applicability of academic management research. The inability to understand and characterize performance consistently reduces the effect and relevance of management research. Inconsistency leads to a divergence in results, undermining the clarity of the findings and the confidence of researchers and managers alike. With a more coherent understanding of the meaning and measurement of performance, we hope to make a small step toward convergence in understanding the most common dependent variable of interest in our research.

The structure of the remainder of this review is as follows. We begin by reviewing the domain of organizational performance. This domain stretches across a diversity of users and uses that make the construct of organizational performance both complex and multidimensional. We then consider the literature on the measures available. Uniting these literatures provides guidance on methodological best practice in measuring performance. An important agenda for further research that seeks to validate these measurement approaches is then suggested.

## **Review of the Domains of Organizational Performance**

In examining the construct of organizational performance, we start by defining organizational performance. This requires the examination of the closely related construct of *organizational effectiveness*. We then examine the dimensionality of the construct of organizational performance in detail. This dimensionality arises out of the stakeholders that interact with and within an organization, the heterogeneity of organizational resources, environments and strategic choices, and the variation of performance over time.

### *Organizational Performance Versus Organizational Effectiveness*

Although organizational performance dominates the strategic management literature, not to mention economics, finance, and accounting, it is not unchallenged. Performance is one type of effectiveness indicator, with both advantages and disadvantages. Hence, we first need to distinguish between organizational performance and the more general construct of organizational effectiveness (Venkatraman & Ramanujam, 1986). Organizational effectiveness is a broader construct that captures organizational performance, but with grounding in organizational theory that entertains alternate performance goals (Cameron & Whetten, 1983). Management research in general, and strategic management research more specifically, has taken a more limited empirical view, emphasizing the central role of accounting, financial, and stock market outcomes. To simplify this discussion and remain consistent with the usage in the literature, we will distinguish between organizational effectiveness and organizational performance.

**Organizational performance** encompasses three specific areas of firm outcomes: (a) financial performance (profits, return on assets, return on investment, etc.); (b) product market performance (sales, market share, etc.); and (c) shareholder return (total shareholder return, economic value added, etc.).

**Organizational effectiveness** is broader and captures organizational performance plus the plethora of internal performance outcomes normally associated with more efficient or effective operations and other external measures that relate to considerations that are broader than those simply associated with economic valuation (either by shareholders, managers, or customers), such as corporate social responsibility.

Although innovation and efficiency measures are generally placed into the wider conceptual domain of organizational effectiveness (Cameron & Whetten, 1983; Venkatraman & Ramanujam, 1986), other management researchers have taken these same variables as their dependent performance measure (e.g., Capon, Farley, & Hoening, 1990; Hall, Jaffe, & Trajtenberg, 2005).<sup>2</sup> The implementation of balanced scorecards has also increased the attention given to wider aspects of organizational effectiveness in management research. Although primarily used for internal management and control, balanced scorecards explicitly include measures of financial performance, customer outcomes, innovation, and internal processes (Kaplan & Norton, 1996). Balanced scorecards are closely tailored to each individual firm. This tailoring makes comparing balanced scorecard results across firms almost impossible, given that the implementation of a balanced scorecard for a single firm is already complex and difficult (Neely & Bourne, 2000; Schneiderman, 1999). It is for this reason that organizational performance dominates organizational effectiveness for management researchers. The narrower domain of organizational performance provides the useful potential to make meaningful comparisons across firms and industries.

What is evident, however, is that even with a narrower domain, organizational performance is not a one-dimensional theoretical construct nor is it likely to be characterizable with a single operational measure. Although the multidimensionality of performance is recognized in accounting (e.g., Callen, 1991) and finance (e.g., Henri, 2004) and discussed

theoretically in the management literature (Venkatraman & Ramanujam, 1986), empirically, the lack of consistency in the measurement of organizational performance in management research has revealed a surprising lack of researchers “walking the walk.”

It follows that before we can discuss the importance of operational measurement issues, it is critical that we examine the sources of the multidimensionality of organizational performance in detail. Our review suggests that dimensionality is related to three sources within the research context: (a) Who are the *stakeholders* for whom a performance measure is relevant? (b) What is the *landscape* over which performance is being determined? and (c) What *timeframe* is relevant in measuring performance? Validly measuring performance requires allowing for these sources of multidimensionality.

### *Source of Dimensionality 1: The Stakeholders*

Few would argue with the contention that all stakeholders have some potential claim to the rents arising from the activities of the firm (Freeman, 1984). Viewed broadly, stakeholders include anyone who “can affect or is affected by the achievement of the organization’s objectives” (Freeman, 1984). They can have different motivations that imply different measurement needs; for example, managers, employees, suppliers, customers, stockholders, governments, and nongovernmental organizations (NGOs) would all concentrate on measures of performance most directly related to their own goals (Fitzgerald & Storbeck, 2003; Hillman & Keim, 2001). Independent of whether one views the normative or descriptive view of stakeholder theory as relevant, or whether potential claims to organizational rents are legitimate, there is little doubt that, in reality, an organization’s management engages in an active tradeoff of stakeholder interests (Blattberg, 2000; Mitchell, Agle, & Wood, 1997). This can be seen both at the organizational level and the level of the country and has implications for the applicability of measures of performance.

The “Anglo-American” model of the United States and the United Kingdom gives primacy to the interests of shareholders (Dore, 2000). If shareholders were the sole stakeholders to be considered, then maximization of some measure of shareholder return can be justified as the sole criterion of performance. However, in practice, other stakeholders such as the firm’s managers and suppliers must be considered. This is particularly so for firms from Continental Europe and Japan where more attention is placed on the interests of broader stakeholders (Dore, 2000). Adding in other stakeholders—such as employees, partners, NGOs, and society at large—increases the dimensionality of performance to include items such as employment conditions and environmental sustainability, bringing it closer to that of organizational effectiveness. In this context, the selection of a single measure may bias measurement by ignoring the distribution of value created across stakeholder groups.

Operationally, management research has adopted a much narrower definition of stakeholders that focuses on a firm’s economic interests and parties that bear risks in relation to them in order to narrowly define legitimate claims (e.g., Clarkson, 1995). This is reflected in the popularity of financial and accounting measures, which are closely associated with managers and shareholders, two of the highest legitimacy stakeholder categories (Mitchell et al., 1997).<sup>3</sup> A popular distinction is between *primary* stakeholders like suppliers and

customers who have a direct exchange relationship with the firm and *secondary* stakeholders who do not (Clarkson, 1995). Relationships with primary stakeholders are characterized by a degree of mutual dependence, whereas secondary stakeholders have little effect on the firm (Casciaro & Piskorski, 2005). Analyses of firm social performance indicate that meeting the wider interests of stakeholders with a close connection to the firm is associated with higher performance as measured by return on assets (ROA) and earnings-per-share (EPS). In contrast, higher performance on dimensions of interest to secondary stakeholders has not translated into higher financial performance (Van der Laan, Van Ees, & Van Witteloostuijn, 2008).

The nature of these measures can also be firm specific, depending on internal policies. The selection of remuneration policies will affect the relevance of particular measures for staff groups. For instance, cash flows, accounting numbers, and stock prices produce different incentives for managers (Dutta & Reichelstein, 2005). More broadly, management strategy also leads to different organizations placing emphasis on different aspects of their performance. For instance, organizations that rely heavily on debt financing would be expected to manage investments more in line with the demands of these stakeholders and hence engage in less risky investment activity (Devinney & Milde, 1990).

*Implication 1:* Measuring performance requires weighing the relevance of performance to focal stakeholders.

### *Source of Dimensionality 2: Heterogeneity—Resources, the Environment, and Strategic Choice*

Organizations are heterogeneous in their resources and capabilities and how and where they choose to use them (Barney, 1991). At the most basic level, small and large firms are likely to perform in quite different manners. Although linked by competition, these firms have very different resources and strategies. This is evident in how firms measure themselves. Large organizations use both financial and nonfinancial performance measures but favor financial measures (Malina & Selto, 2004). Small firms also use both financial and nonfinancial variables to measure their performance. In a cross-country survey, Laitinen and Chong (2006) found that small Finnish companies focused on profitability, product margins, customer satisfaction, and liquidity. Small U.K. companies were similar, giving less emphasis to overall profitability but also weighing debt levels highly. This evidence supported earlier findings by Davig and colleagues (Davig, Elbert, & Brown, 2004) that product performance is more prominent in the evaluation of performance for small firms.

Industry and environmental context frames resources and strategies, moderating performance outcomes (Hawawini, Subramanian, & Verdin, 2003; McGahan & Porter, 1997; Rumelt, 1991). For example, McGahan (2004) identifies four trajectories of industry change: progressive, radical, intermediating, and creative. The appropriateness of the strategic choices firms can make depends critically on the trajectory of an industry, the implication being that the performance of sets of resources and assets will depend predominantly on the trajectory in which they are applied (McGahan, 2004). McGahan likens these trajectories to

highways, which are bounded by largely immovable barriers that keep traffic on the road. As a consequence, they strictly define the set of performance outcomes that are potentially available to the firms situated within their constraints trajectory. Organizational responses to environmental factors also differ (Miles & Snow, 1978). This heterogeneity generates multiple paths to performance that are influenced by a broad variety of factors (Hofer, 1983; Lenz, 1981). The validity of comparisons will be highest where firms are on the same path. A survey of executives of 321 business units found that performance comparisons within strategic groups were the most valid (Davis & Pett, 2002).

Performance itself is likely to be somewhat firm specific, as the strategic choices a firm makes will dictate which performance measures will reflect the latent performance construct (Steers, 1975). Understanding how different independent variables link to a dependent performance variable is then no longer trivial (March & Sutton, 1997). Assuming away this dimensionality will lead to misdirected or biased measurement. From a measurement perspective, it is unlikely that changing strategies leaves the dimensionality of the performance indicators unchanged. Because different strategies relate to different dimensions of performance, so they also alter the way these performance dimensions load onto the latent construct. For instance, Fryxell and Barton (1990) found that the measurement structure of four common accounting and stock-market-based indicators (that is, measures commonly regarded as objective and within the domain of financial performance) differed between groups of firms that had adopted two distinct strategic stances and over time. The factor loadings changed materially and in counterintuitive ways. Hence, not only does the appropriate measure of performance vary with the situation, but the measurement structure of indicators that capture that latent construct will change also.

The relationship between measures and performance is also influenced by which measures the firm uses internally and how these are embedded into incentive and control systems within the firm—for example, the firm's own key performance indicators (KPIs). In other words, the internal measurement systems used will influence performance at the individual and organizational levels (Levenson, Van der Stede, & Cohen, 2006). This reveals an important gap in academic publications, as few, if any, empirical papers using firm performance as a dependent variable account for the internal incentive systems operating in the firms they are studying. Hence, we are making a quantum leap of faith in assuming that our measures relate to what the firm is seeking to achieve. Indeed, both Stern Stewart (Stern, Stewart, & Chew, 1995) and Kaplan and Norton (1996) emphasize that their measurement systems must play an active role in the management of the adopting firms in order to be effective. And to their credit, the adoption of residual income measures, such as economic value added (EVA) as promoted by Stern Stewart, has been shown to alter managerial decision making. Adopters of EVA show tighter investment control, more capital being returned to shareholders, and greater increases in residual income (Wallace, 1997).

*Implication 2:* Measurement of performance must take into account heterogeneity of environments, strategies, and management practices.



### *Source of Dimensionality 3: The Measurement Timeframe and the Persistence of Performance*

A number of empirical studies have confirmed that performance itself does not persist indefinitely (Jacobson, 1988; Waring, 1996). This warns against the adoption of short- or medium-term measures, as these can be heavily biased by random fluctuations. In a famous example, a third of the “excellent” firms identified as superior long-term performers by Peters and Waterman (1982) in their study for *In Search of Excellence* had run into significant problems by the time the second edition of their very popular book went to press (“Who’s Excellent Now?,” 1984). As a group, the Peters and Waterman firms exhibited only average performance after publication (Aupperle, Acar, & Booth, 1986; Ramanujam & Venkatraman, 1988). By selecting firms based on a small number of criteria over a limited period of time, they failed to account for the natural variability and stickiness in performance. As a consequence, researchers and managers must be careful in the interpretation of performance differences, regardless of whether or not they sampled on their dependent variable. Empirically observed performance outcomes can be partially explained by random events and the nature of the models used to capture performance over time (Powell, 2003). Even completely random Markov processes can cause heterogeneous performance outcomes in the absence of firm-specific heterogeneity (Denrell, 2004). This warns against the adoption of short- or medium-term measures, as these can be heavily biased by random fluctuations.

Changes in performance have been shown to occur at different rates for industry, corporate, and business unit factors (McGahan & Porter, 1999, 2003). Research that targets specific factors needs to measure performance in a manner that matches that context. There is evidence that suggests that industry factors can sustain performance over the longer term (Waring, 1996). Consistent with this, McGahan and Porter (1999) found that industry-driven performance effects persisted at a rate of 76.6% to 81.8% but that firm-specific performance persisted at weaker rates of only 47.9% to 65.5%. As a consequence, studies should select a measurement timeframe in accordance with the phenomena they are examining.

Many performance measures are themselves time dependent. Reputation effects link past performance to future performance, creating feedback within the dimensionality of performance itself (McGuire, Schneeweis, & Branch, 1990; Roberts & Dowling, 2002). Even when persistence suggests the presence of ongoing competitive advantage, that performance persistence is partially attributable to the time series characteristics that lead to stickiness in return measures (Jacobson, 1987, 1988). Auto-correlation can also be caused by unwanted biases. For instance, subjective measures are susceptible to bias arising from the availability of recent events (Tversky & Kahneman, 1973), whereas other relationships between measures, including the halo effect (Rosenzweig, 2007), can lead to spurious relationships being inferred as substantive (Edwards & Bagozzi, 2000). Moreover, many objective measures, including accounting rates of return, have temporal properties that imply that the internal antecedents of performance in any one year may not relate directly to performance in that year even though they appear to be highly correlated (Jacobson, 1987).

It is correctly argued by proponents of shareholder value that one needs a measure of performance that not only measures how a decision determines performance today but forever into the future, in essence, removing the timeframe from the equation (Benston, 1985;

Rappaport, 1978). In theory, with perfect information, total shareholder return is just such a measure. However, there are three issues that distort shareholder return as anything but an unbiased estimate of total value. First, information is imperfect and the financial market return can be, at best, a consensus forecast of value made by human beings. This is a fact as true for investors as it is for managers, who arguably possess better information. Second, the market return represents a consensus forecast at a point in time. This forecast is subject to updating as information becomes available. Third, the financial market itself is not free from structurally and psychologically induced biases. For example, the Internet boom-and-bust of the late 1990s represented a mixture of just such biases (Bond & Cummins, 2000).

*Implication 3:* Measurement of performance requires an understanding of the time series properties relating organizational activity to performance.

## Review of the Measurement of Organizational Performance

There are three common approaches to organizational performance measurement seen in the literature. The first is where a single measure is adopted based on the belief in the relationship of that measure to performance (e.g., Hawawini et al., 2003; Hillman & Keim, 2001; Roberts & Dowling, 2002; Spanos, Zaralis, & Lioukas, 2004). Ideally, these beliefs are supported by theory and evidence but, as noted above, are often merely assumed. The second approach is where the researcher uses several different measures to compare analyses with different dependent but identical independent variables (e.g., Baum & Wally, 2003; Contractor, Kundu, & Hsu, 2003; Miller, 2004; Peng, 2004). The third approach is where the researcher aggregates dependent variables, assuming convergent validity based on the correlation between the measures (e.g., Cho & Pucik, 2005; Goerzen & Beamish, 2003). This is most common with subjective measures of performance where the investigator is seeking something akin to trait-based psychometric validity (see Varadarajan & Ramanujam, 1990). However, it is not uncommon to see operational and financial market measures also being aggregated (see Rowe & Morrow, 1999). The justifiability of these approaches depends crucially on whether the specific measures used meet the theoretical, statistical, and psychometric assumptions made. We address the nature of these specific measures below by first examining the objective measures of performance—accounting and financial market measures, plus firm survival—followed by subjective and quasi subjective measures—such as survey-based self-reports and Likert responses. These measures target the financial, product market, and shareholder outcomes that constitute performance.

### *Objective Measures of Organizational Performance*

*Accounting measures.* Accounting measures are the most common and readily available means of measuring organizational performance (a summary of accounting measures is included in Table 2). The validity of their use is found in the extensive evidence showing that accounting and economic returns are related. For instance, Danielson and Press (2003) found that the correlation between accounting and economic rates of return was above 0.75, and

Jacobson (1987) found that despite a weak  $R^2$  of 0.2, return on investment (ROI) was able to distinguish performance between firms and over time. Nevertheless, researchers must be cognizant of the fact that these measures can be distorted by accounting policies, human error, and deception.

It is important to note that the rules that accounting systems are based on (such as GAAP standards) are not always consistent with the underlying theoretical logic of organizational performance. For instance, choices about depreciation schedules, inventory, and booking expenses can undermine the ability to accurately tap the time dimension. To rigorously apply accounting measures, one must understand the nature of the rules (equations) that define the measure of interest. However, researchers rarely have the inclination, time, or data to achieve this.<sup>4</sup> Another important limitation of accounting performance measures is that they emphasize historic activity over future performance (Keats, 1988). Due to their reliance on auditable sources, accounting measures reflect what has happened and can be quite limited in anticipating and revealing expectations about future performance—a fact that possesses both a negative side, as in the case of Enron, and a positive side, as in the case of many early Internet companies. Hence, the apparent predictability and validity of accounting measures as signals of economic returns may have less to do with their validity and more to do with the stationary properties of the environment in which the measurement is taking place. The implication is that the more turbulent the environment is, the less clear the rules of performance are, and the more variable the regulatory and institutional environment in which firms are operating, the less valid and comparable are accounting measures as signals of economic returns. For instance, Jusoh and Parnell (2008) encountered difficulties applying Western accounting measures in the emerging Malaysian environment but found that measures of organizational effectiveness, such as customer and employee satisfaction, were more robust. A case study on measurement in Vietnam also found accounting measures to be a biased reflection of performance (Luu, Kim, Cao, & Park, 2008).

Although normally considered a marketing measure, market share is another product of the accounting system. Market share is the ratio of the sales of the firm to the total sales in the relevant product market. As a consequence, it is composed of the accounting sales figures of all firms in an industry or product market. There is some disagreement over the classification of market share, some studies viewing it as an antecedent of financial performance (e.g., Capon et al., 1990) and others as a performance measure in its own right (see the appendix).

*Financial market measures.* Within the strategy, economics, and finance literatures, financial market-based measures—most dominantly shareholder return—are the preferred instrument for characterizing organizational performance (see Table 3 for a summary of financial market measures). The greatest strength of these measures is that they are forward looking, in theory representing the discounted present value of future cash flows (Fisher & McGowan, 1983). They also incorporate intangible assets more effectively than accounting data (Lev, 2001), something of clear relevance to those interested in resource-based and knowledge-based views of the firm. However, the connection between financial market measures, such as the stock price or excess stock returns, to the actual performance of the firm depends on how much of the rent generated from its activities flows to shareholders and the informational efficiency of the financial market. The usual justification of these measures is that

**Table 2**  
**Accounting measures**

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Cash flow from operations	This accounting measure is used to examine whether cash flow differs significantly from earnings. It is defined as net operating profit plus noncash expenses minus noncash sales.
Earnings before interest and taxes (EBIT)	This basic measure is often recorded on accounting statements as operating profit. This is the firm's profit, which is defined as revenues minus costs of goods sold and administrative and selling costs associated with the firm's operations. Interest and taxes the firm must pay are not deducted in the calculation of EBIT.
Earnings before interest, taxes, depreciation, and amortization (EBITDA)	Like EBIT, EBITDA is defined as the firm's operating profit and does not make any allowance for interest and taxes that must be paid. It is also adjusted to remove the effects of noncash expenses such as depreciation and amortization (these are deducted from the cost component).
Market share	Firm's sales revenue in the product market divided by the total sales revenue available in that market. Although it can be defined as unit sales volume divided by the total volume of units sold in that product market, this is very rare in management research.
Net operating profits (also known as earnings)	This is equal to the firm's revenue minus the cost of goods sold and selling, general and administrative expenses. Taxes and interest are removed to reach this net figure.
Net operating profit less adjusted taxes (NOPLAT) (also known as net operating profit after tax [NOPAT])	This measure is similar to net operating profit but is adjusted to remove several accounting distortions. It provides a cash-based measure of net operating profit. Typically, this requires subtracting taxes after making adjustments for the effect of tax deferrals and taxes on interest and nonoperating income, adding back lease expenses and unwinding the amortization of goodwill. Some consultants make up to 160 adjustments. Interest costs are not subtracted; this is important as this measure is often used in EVA calculations that take interest costs into account by allowing for the cost of capital separately.
Profit margin	This is the ratio of net operating profit to sales.
Return on assets (ROA)	This is a very popular accounting measure of performance. It is defined as the ratio of net operating profit to the firm's start-of-year assets recorded on its balance sheet.
Return on book-valued assets	This is return on assets but using the end-of-year book value of assets.
Return on capital employed (ROCE) (often called return on capital [ROC])	ROCE is a measure of how well a firm is using capital to generate revenue. It is defined as EBIT divided by employed capital. Employed capital includes long-term debt and is equal to total assets less current liabilities and the value of intangible assets.
Return on equity (ROE)	A measure of how much the firm generates for its owners, ROE is equal to net profit divided by the book value of shareholder's equity. Shareholder's equity usually includes the value of reserves as these could be paid out to shareholders.

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*(continued)*

**Table 2 (continued)**

Return on investment (ROI)	This is a leading traditional measure. ROI is usually defined as the ratio of net operating profit to the net book value of assets. The net book value of assets is equal to the firm's assets less the value of intangibles and total liabilities. In recent times, an increasing number of publications use NOPLAT and other adjusted profit measures as the numerator.
Return on invested capital (ROIC)	This increasingly popular measure is defined as the ratio of NOPLAT to the firm's invested capital. Invested capital is defined as total assets less excess cash and the value of noninterest-bearing current liabilities. These two adjustments to total assets are intended to remove the effects of assets that do not need to be supported by capital.
Return on net assets (RONA)	This measure focuses on the assets the firm needs to generate its profit. It is calculated as the ratio of NOPLAT to net assets. Net assets is defined as fixed assets plus cash plus required working capital. This measure is closely related to EVA, as it is sometimes defined as $EVA = (RONA - WACC) \times \text{Invested Capital}$ .
Return on sales (ROS)	This is the ratio of net operating profit to the sales made by the firm in the period.
Return on total assets	This is the ratio of earnings available to common stockholders to the firm's assets. This is virtually identical to return on assets, the use of <i>total</i> in the name signals that net profit (earnings) is adjusted to remove dividends for preference shares and other nonresidual claims (although most versions of ROA also do this anyway).
Risk-adjusted return on capital (RAROC) (also known as return on risk-adjusted capital [RORAC])	This measure is used primarily by financial institutions. It is defined as the ratio of risk-adjusted earnings to economic capital employed. Here, the capital employed is evaluated relative to the market, credit, and operational risk involved. The results of a RAROC model are then generally used in calculating EVA or another measurement that accounts for risk.
Sales	This is the firm's revenue from goods sold.
Sales growth	This is the change in sales over the period, expressed as the difference between sales last period and those this period as a percentage of the sales last period.
Variance in accounting profitability	A common accounting measure of risk is to use the variance in accounting profitability. This is often based on the volatility of one of the returns, such as ROA or ROI.

firms are instruments of shareholders. But, as noted above, this assumption about the stakeholder dimension may not be as applicable in Continental Europe or Japan (Dore, 2000). Moreover, research on psychological and other influences suggests that market values do not simply reflect an efficient appraisal of future cash flows (Kahneman & Riepe, 1998; Malkiel, 2003).

Empirical research in finance has shown that only a small proportion of share price movement is explained by systematic economic effects (Cutler, Poterba, & Summers, 1989; Roll, 1988). Instead, share price movements are often attributable to financial market volatility (Shiller, 1989), momentum (Chan, Megadeath, & Lakonishok, 1996), and herding behavior

**Table 3**  
**Financial market measures**

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Beta coefficient	The $\beta$ -coefficient from the capital asset pricing model (CAPM). This is a measure of the level of systematic risk associated with the individual firm relative to the market portfolio.
Earnings-per-share (EPS)	This is a traditional measure of firm value. It is equal to net operating profit minus dividends paid to preference shares divided by the number of common stocks issued.
Jensen's alpha	This is the $\alpha$ -coefficient from the CAPM. Jensen's alpha is a measure of a firm's excess return over that associated with the systematic risk of its operations. That is, this captures unique exceptional positive or negative performance.
Market value (or market capitalization)	This is the total value of a firm's common stock (which represents the residual value of the firm's resources). It is equal to the number of shares outstanding multiplied by their current stock price.
Price-to-earnings ratio (P/E ratio)	The P/E ratio is a common method of comparing firm valuations. It is defined as the ratio of the current stock price to the annual earnings per share the firm pays out.
Return on market-valued assets	Return on market-valued assets is the annual operating income divided by the beginning-of-year market value of equity plus the book value of long-term debt.
Stock price	This is the price of the firm's listed common stock.
Total shareholder return (TSR)	Captures the gain (loss) made by shareholders during the period (generally each year). TSR is the sum of the change in stock price during the year plus any dividends paid out, expressed as a percentage of the opening value of the stock.
Tracking stocks	Securities issued that pay dividends based on the performance of some subset of the firm's divisions (usually those from a single business unit). These provide a more pure reflection of the performance of a firm's divisions (and are especially useful for multi-industry firms).

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(Graham, 1999; Grinblatt, Titman, & Wermers, 1995). The Internet boom-and-bust of the late 1990s represents a mixture of such biases (Bond & Cummins, 2000). One simply has to examine the situation associated with Worldcom and Enron to understand that such future forecasts are themselves conditional on available data. The role of this information is starkly confirmed by Chaney and Philipich (2002), who showed that the value of all Arthur Anderson clients declined when the veracity of Anderson's audits was called into question and that this decline was even worse for those associated with the Houston office, which was responsible for auditing Enron.

A major limitation of the use of financial market data in management research is that it evaluates the organization as a whole. For all but the few firms that have issued tracking stocks (Robinson, 2000), it is not possible to apportion market measures between activities (Jacobson, 1987). Therefore, although market value might be generally recognized as the most appropriate measure of overall organizational performance, it is less useful for research focusing on performance where the dimensionality is defined in terms of a product or a

strategic business unit (SBU). Attempts to disaggregate business unit performance are also problematic. Several researchers have pointed out that the logic of having a bundle of business units traded as a block implies that measuring financial performance and risk at the business unit level will be flawed due to the failure to account for the synergy and cannibalization associated with the interaction of the units (Bulow, Geanakoplos, & Klemperer, 1985; Devinney & Stewart, 1988). Hence, even if one were measuring business unit level performance, it is unlikely that this alone will account for the performance of that unit within the strategic context of the corporation as a whole.

*Mixed accounting/financial market measures.* An advantage of mixed accounting/financial market measures is that they are better able to balance risk (largely ignored by accounting measures) against operational performance issues that are sometimes lost in market measures. Examples of mixed measures are given in Table 4. Tobin's  $q$  is perhaps the earliest and most popular hybrid measure of firm performance. Tobin's  $q$  is the ratio of the market value of firm assets to their replacement cost and is a theoretically based measure of economic return (Tobin, 1969). One difficulty with the adoption of Tobin's  $q$  is that the replacement value of the firm's assets is almost always measured through its closely related proxy, the book value of assets (Varaiya, Kerin, & Weeks, 1987). This means that this is the historical rather than current replacement cost. Despite empirical similarity (a correlation between the two of more than 0.9 has been observed; Perfect & Wiles, 1994), the adoption of book value introduces the potential for a number of accounting distortions. This is seen in the failure of empirical Tobin's  $q$  measures to include intangible assets in that replacement cost. Several authors have proposed formally measuring intangible assets and particularly the intangible intellectual capital resident within software, patents, and employees (e.g., Edvinsson & Malone, 1997; Sveiby, 1997). However, despite these calls to improve the accounting of intangible assets, and their inclusion in firm financial statements, most current Financial Accounting Standards Board (FASB) accounting measures ignore them.

This limitation has led to the development of a number of alternative mixed measures. Altman's score (Altman, 1968) was one of the first such empirical measures and developed specifically to predict catastrophic financial events. The Z-score predicts a firm's chance of bankruptcy, itself an extreme financial, product market, and shareholder outcome, using a combination of accounting and stock market measures including the ratios of working capital to total assets, retained earnings to total assets, the market value of equity to the book value of liabilities, and sales to total assets (Altman, 1968). Stern Stewart's trademarked EVA has become perhaps the most popular mixed measure (Stern et al., 1995). Early research suggested that EVA, which is based on the return over the cost of equity, was a better predictor than EPS, EPS growth (Milunovich & Tseui, 1996), ROA, ROE, and return on sales (ROS) (Lehn & Makhija, 1997). More recent studies have produced equivocal results, with accounting measures retaining incremental explanatory power (Chen & Dodd, 1997) and matching EVA (Biddle, Bowen, & Wallace, 1997; Chen & Dodd, 2001).

*Survival.* Survival is a common dependent variable in management research, particularly in organizational sociology and entrepreneurship where increasing attention is given to ecological explanations of firm performance (Hannan & Freeman, 1977). Many firms fail,

**Table 4**  
**Mixed accounting/financial market measures**

Balanced scorecard	The balanced scorecard is a framework that draws together multiple measures aimed at financial performance, internal business processes, customer perspectives, and innovation and learning. The aim is to enable firms to build a comprehensive performance measurement system. There is a similar concept in French accounting called the <i>Tableau de Bord</i> .
Cash flow per share	This is defined as the cash flow from operations minus preferred stock dividends divided by the number of common shares outstanding. This is a measure of the cash flow associated with each share.
Cash flow return on investment (CFROI)	This is an inflation-adjusted approximation of the internal rate of return earned by a company over all its operating assets. Normally, this is done by discounting cash flow projections that are calculated based on ROI.
Cash value added (CVA)	The CVA is the difference between a firm's operating cash flow (OCF) and the operating cash flow demand (OCFD) that it must pay shareholders. The OCF is the firm's EBITDA (which includes only cash effects) less any working capital changes and nonstrategic investments made during the period. The OCFD is defined as the investors' opportunity cost of the investment in cash terms. This provides a dollar value estimate of the net performance of the firm.
Discounted cash flows (DCF)	This is the present value of future cash flows. These are discounted for the time-value of money, usually at the firm's WACC. DCF models then compare future free cash flows to the debt and other cash investments required to support them.
Economic value added (EVA) (the generic name for this is economic profit)	This highly popular measure adjusts accounting earnings for the cost of capital. It is normally defined as NOPLAT – (WACC × Invested Capital). The WACC is usually calculated through a rule of thumb, such as it being the risk free rate plus 6% multiplied by the firm's beta (Chen & Dodd, 1997).
Free cash flows	Free cash flows are the cash remaining for shareholders after all other claimants are paid. In each period, they are defined as the firm's net operating profit less taxes, operating investment required to sustain the firm, and any additional working capital requirements. These are a key component of DCF calculations, which discount them back to present values.
Internal rate of return (IRR)	The IRR is the discount rate that results in the NPV of a series of future cash flows flowing from an investment being zero.
Market-to-book value	The ratio of an organization's market value to the book value of assets.
Market value added (MVA)	Defined as the market value of the firm less the book value of debt and equity. Therefore, it represents the excess value of the firm over the capital used to support it.
Net present value (NPV)	NPV is the difference between the present value (PV) of discounted future cash flows and the investment required to earn them.
Shareholder value analysis (SVA)	This measurement approach assesses shareholder value as the residual value of the firm. Generally, it is defined as shareholder value equal to corporate value minus debt. Corporate value is calculated by discounting future earnings at the cost of capital (or weighted average of the cost of debt and equity) and adding a residual value to capture the present value of cash flows outside the discounted period plus the current value of any liquid assets (such as cash or marketable securities) (Rappaport, 1986).
Tobin's <i>q</i>	This measure is defined as the ratio of the market value of the firm's assets to their replacement cost. The market-to-book value is often used as a proxy as the replacement cost of the firm's assets is difficult to estimate.
Total business return (TBR)	TBR is closely associated with CFROI. It adopts an approach similar to TSR but is based on cash flows. TBR is defined as the terminal value of business less cash investments made during the period plus cash flow received during the period

(continued)



**Table 4 (continued)**

Warranted equity value (WEV)	WEV is a modification of EVA used by financial institutions. Here, the cost of capital is calculated based on capital-at-risk (due to the prudential requirements applying to banks).
Weighted average cost of capital (WACC)	This is a measure of the cost the firm must pay for the capital it employs. It is the weighted average of the cost of debt and the cost of equity. The cost of debt is usually adjusted to reflect the tax deductibility of interest expenses.
Z-score	Developed by Altman (1968), the Z-score provides an indication of the likelihood of a firm going bankrupt. It is based on a linear model of five common financial ratios: working capital/total assets, retained earnings/total assets, EBIT/total assets, market value of equity/book value of total liabilities, and sales/total assets.

making survival pertinent to researchers and managers alike (Dunne, Roberts, & Samuelson, 1988). Survival and financial performance outcomes are closely related, with an examination of financial market performance finding that delisting firms underperformed the median stock market return of firms on the NYSE and AMEX by 48% from 10 years to 1 year before delisting (Baker & Kennedy, 2002). This is consistent with theory that suggests that adaptation and selection operate simultaneously, with the relative importance of each depending on the degree of organizational inertia, and the nature of the research in terms of the period of interest (Hannan & Freeman, 1977). Survival is generally measured by a categorical variable capturing the ongoing presence of the firm. The positive aspect of this is that it is easier to obtain historical data on the existence of a SBU than its disaggregated financial performance. However, not all exits are equal or even directionally equivalent. Mergers or being acquired suggest higher performance than bankruptcy. Indeed, being acquired generally results in shareholders of the target receiving a premium (Jarrell & Poulsen, 1987). And in the case of many smaller firms, being acquired is potentially a signal of success and strength rather than weakness. Furthermore, the infrequency of liquidations suggests that survival is unlikely to provide sufficient variance to discriminate between high and low performing firms in studies that focus on short-term phenomena. Indeed, Hannan and Freeman (1977) note that of the 1955 *Fortune* 500, only 1 (0.2%) had liquidated by 1975 whereas 122 (24.4%) had merged. Of the remainder, 268 (53.6%) remained and 109 (21.8%) had slipped off the list due to relatively low growth. This also illustrates that categorical survival measures provide only limited insight into the relative performance of the heterogeneous firms that are placed into each category, severely curtailing the dimensionality of performance. At the extreme, survival measures would provide no information on the relative performance of the 13 firms that existed during the American Civil War that still survived in 1976 (Hannan & Freeman, 1977).

### *Subjective Measures of Organizational Performance*

Subjective measures ask supposedly well-informed respondents (key informants) about organizational performance. This allows them to be strongly tailored to the dimensionality of the context of interest. Broadly speaking, subjective measures can be divided into two

groups: (a) those that are fully subjective and (b) those that replicate objective measures, which we term *quasi-objective*. Subjective measures have traditionally been viewed with a great degree of skepticism based on the fact that the more objective the focal construct is, the less scope there is for bias. Subjectivity introduces increased error by allowing the imperfections of human cognition to play a greater role (Gilovich, Griffin, & Kahneman, 2002; Kahneman & Tversky, 2000). Empirically, this has been supported by studies of the *Fortune* reputation index, a broad multidimensional subjective data index, showing that evaluator assessments of the more specific dimensions were better at explaining objective performance than those on more abstract dimensions (McGuire et al., 1990).

Yet, despite these issues, the broadening of the theoretical and normative aspect of firm performance has led to increased interest being focused on the more subjective dimensions of performance in recent years. This increased attention has been in line with the trend of assessing performance against a triple bottom line of *economic*, *social*, and *environmental* performance and against balanced scorecards that add customer, internal process, and innovation measures to the measurement of financial performance (Kaplan & Norton, 1996). To illustrate the trend and its implication, we focus on two of these areas: corporate social performance (CSP) and reputation.

Assessments of CSP have become increasingly common and found their way into analysts' evaluations of firms' strategic and financial positions. CSP is now considered alongside financial performance in many practical applications and is increasingly finding its way into mainstream regulatory requirements. This has further blurred the application of the distinction between organizational performance and organizational effectiveness. More than 4,700 firms from 130 countries, including 108 of the 2007 Financial Times Global 500, have committed to providing annual assessments of CSP under the United Nations' Global Compact framework (United Nations, 2007). Researchers, too, have responded to this trend. By 2003, there were already 52 published studies that estimated the correlation between CSP and financial performance (see Orlitzky, Schmidt, & Rynes, 2003). Yet, even here, the results are not clear and depend critically on context and measurement. A meta-analytic review of these studies showed a true correlation between CSP and more traditional financial performance measures of 0.36 (Orlitzky et al., 2003). However, Margolis, Elfenbein, and Walsh (2007) find that what effects exist are small, dependent on the measures used and categories studied, and bidirectional—logically and empirically, it is as likely that financial performance causes CSP as it is that CSP drives financial performance. The most common measure of CSP is the index produced by Kinder, Lydenberg, and Domini (KLD). The KLD index assesses CSP based on social “strengths” and “concerns,” including the environment, diversity, employee relations, human rights, product features, and corporate governance. A recent analysis of the KLD index found that it was able to explain 69% of the variance in ROA and 39% of the variance in EPS for a sample of 734 corporations in the period from 1997 to 2002 (Van der Laan et al., 2008).

The *Fortune* reputation surveys also subjectively assess performance (see Chakravarthy, 1986; Fombrun & Shanley, 1990). The *Fortune* reputation measures are based on subjective evaluations by managers and stakeholders of eight dimensions: financial soundness, long-term investment value, use of corporate assets, quality of management, quality of products (or services), innovation, ability to attract and retain talented people, and social responsibility. The eight dimensions have been found to have a reliability of  $\alpha = 0.97$  (Fombrun & Shanley, 1990), are strongly

correlated with past financial performance (Rowe, Cannella, Harris, & Francolini, 2003), and have a modest correlation with future performance (McGuire et al., 1990). The reputation measures also contain explanatory power distinct from that of financial performance. Roberts and Dowling (2002) found that reputation included a clear "financial reputation" component that was related to earlier financial performance but that there was also a material "residual reputation." Residual reputation predicted future performance even though there was evidence that residual reputations were supported by factors (e.g., brand advertising) that actually weaken short-term profitability (Roberts & Dowling, 2002).

*Fully subjective measures.* Fully subjective self-report measures allow researchers to address latent performance constructs directly. Instead of asking for opinions on some objective measure, as in the case of quasi-objective measures, fully subjective self-report questions assess the underlying performance construct itself. An important aspect of this direct approach is that because these measures are not anchored to any definite object, they are inherently relative (March & Sutton, 1997). For instance, the respondent may be asked to compare the performance of the company to that of a rival, to management expectations, or to some other benchmark. For instance, Gupta and Govindarajan's (1986) performance measure had respondents rate "performance relative to superiors' expectations on a 5-point scale ranging from not at all satisfactory to outstanding" (p. 713). The lack of a fixed reference point also provides subjective methods with much flexibility. Researchers are able to define the content and anchoring of questions to target the dimensions of performance directly, either individually or in aggregate. However, this relativity can make fully subjective measures unreliable in the face of the highly variable aspirations of respondents.

Fully subjective measures face challenges from psychological biases, which can lead to highly skewed and unrepresentative outcomes. Cognitive biases can influence subjective measures, particularly self-report measures from individuals who are part of the focal organization. For example, evidence suggests that respondents tend to view themselves positively (Taylor & Brown, 1988), construe external criteria in their favor (Stajkovic & Sommer, 2000), and rely on causal ambiguity to take credit for positive outcomes (Campbell & Sedikides, 1999). The halo effect can also materially affect perceptions of performance (Rosenzweig, 2007). Sound research design can reduce these biases. For instance, the quality of self-report is increased the closer collection is to the event (Arnold, Collier, Leech, & Sutton, 2000; Mezas & Starbuck, 2003) and by selecting well-informed respondents (Winter, 2003). McGuire et al.'s (1990) study of the *Fortune* reputation index found that items with more specific definitions contained less measurement error.

Yet, despite the obvious issues, the correlation between subjective and objective measures has been shown to be between 0.4 and 0.6 (Wall et al., 2004), with correlations as high as 0.81 achieved by using more specific subjective constructs (Guthrie, 2001). Venkatraman and Ramanujam (1987) compared objective COMPUSTAT data with the subjective perceptions of senior managers for sales growth, net income growth, and ROI and found correlations of 0.44, 0.42, and 0.51 and similar levels of trait, method, and random error variance that constituted roughly 50%, 30%, and 20% of variance, respectively. In addition to evidence supporting moderate convergent validity, Wall et al. (2004) found a high level of discriminant validity with the correlation between subjective and objective profit and

productivity measures found to be significantly higher than the correlation between these measures and their values for previous years. This result is all the more impressive given the well-accepted autocorrelation of performance due to reputation. The measures were also found to display strong construct validity, in that they related to measures of other related constructs in a consistent way (Wall et al., 2004). These empirical findings suggest that researchers should not view the choice of subjective measures as a second-best alternative but, instead, should weigh the tradeoffs between subjective and objective measures against the research context to determine which is more favorable under the circumstances.

*Quasi-objective measures.* Quasi-objective measures elicit specific objective performance information through self-report techniques, for instance, by asking a salesperson the level of sales or the CEO to estimate the market value of the firm. Venkatraman and Ramanujam (1986, 1987) distinguished these measures from objective values collected from secondary sources. However, this is a harsh distinction, as the vulnerabilities of accounting systems suggest that similar imperfections can attend both sources. Influential research has often treated these as equivalent to the fully objective measures they reflect.

Dess and Robinson (1984) compared quasi-objective and fully subjective measures of ROA and sales growth in privately held firms. This review of performance measures indicates that although quasi-objective and fully subjective measures share much variance, some variation remains between them. This is consistent with the dimensionality of performance itself. For instance, it would be surprising if a single organizational action affected accounting, financial market, survival, and subjective measures of performance equally. Indeed, a single action like an asset sale might improve accounting performance while hurting financial market assessments. This suggests the need to select a measure of performance that is closely related to the research question under investigation. It is unfortunate that what this implies (particularly given the bias against publishing insignificant results) is a tendency to select performance measures for which significant effects are either found or likely to be found rather than, more correctly, relating a series of theoretical antecedents to an overarching construct of performance for which some dimensions are relevant and others are not. Researchers need to maintain a broad measure of performance—one that accounts for its multidimensionality but also one that allows for the variation between measures.

*Implication 4:* Performance measures should not be made specific to the research question but be sufficiently robust to cover the domain of organizational performance.

Performance measurement is further complicated by the availability of the data needed to construct the measures and the need to carefully specify how the data and measures relate to other constructs in a model and to one another. The practical issues of collecting the data appropriate for specific measures can be material. For many areas of research, no objective financial market or accounting measures exist. For example, when measuring the performance of the subsidiaries of multinational enterprises (MNE), there may be no objective accounting or financial market data available publicly and, instead, one must rely on subjective managerial estimates. However, even if we put this practical concern aside, the main

problem is the nature of the relationships between the various measures themselves. The specification of models requires consideration of a number of relationships, as financial, product market, and shareholder performance outcomes are associated with many antecedents as well as being related to past performance.

There is little agreement between researchers on either an accepted definition of performance or the appropriate structural form of the relationships between measures. This has produced wide variation in the specification of models used. The divergence in definitions of performance is evident in 14 papers in the appendix that adopt effectiveness measures that they describe as measuring performance. Moreover, establishing a model requires that researchers specify relationships between accounting, financial market, and other measures of performance, between objective and subjective measures of performance, and between performance measures and measures of organizational effectiveness. Research has identified a number of structural relationships between the antecedents of performance and performance outcomes that complicate this challenge. For instance, Bryant, Jones, and Widener (2004) found that measures within a balanced scorecard were strongly interrelated, with learning having direct and indirect effects on process and customer outcomes, which in turn predicted financial performance.

The measures selected and measurement approach used will also affect research findings. Measurement model selection can materially affect the fit of research models (Ailawadi, Dant, & Grewal, 2004). The level of analysis at which measures are collected also matters, with a comparison of coefficients of 10 of the most common predictors of financial performance across 163 studies producing three cases where coefficients with different signs were produced at the business, firm, and industry levels (Capon et al., 1990). Capon et al. report that model specification and estimation method explain significant amounts of variance in reported relationships between accounting and financial market measures and measures of organizational effectiveness and that these effects can be larger than the variance explained by the selection of alternate financial performance measures. Even the specification of performance measures, either as direct reflective indicators of the single-factor performance construct or as second-order indicators of outcomes that formatively define a latent construct, is nontrivial (see Rowe & Morrow, 1999). Hence, it is not clear that simply having more and varied measures increases the clarity of measured performance unless they are also modeled appropriately.

*Implication 5:* Measurement of performance requires an understanding of the relationship between measures.

The synthesis between the review of dimensionality and the review of measures reveals that there is no singular measure of performance that is without limitations. Subjective measures are easily rejected by senior managers and academics as biased, yet the empirical evidence shows that they are not inherently erroneous and that similar criticism could be raised with respect to the limitations of objective measures. Devinney, Yip, and Johnson (2009), using data from more than 3,000 global firms in 38 industries, show that the pattern of correlations between different measures is such that a minimum of three dimensions is necessary just to characterize the basic aspects of performance.

## Measurement Implications and Discussion

Our discussion highlights the implications of using organizational performance in management research. The most important challenge is to isolate how methodological approaches can address the multidimensional nature of performance. There are a number of alternatives available in attempting to resolve the performance measurement dilemma that do not require coming up with completely new measures (in other words, that rely on some combination of accounting, financial market, and objective and subjective measures of some type). The discussion below examines how specific measurement approaches can address the five implications identified. Table 5 summarizes the measurement methods that can address these implications.

What follows is less of a summary of “what works” and more of a call for specific research on how we currently do measure organizational performance and how we might do so in the future. What is clear from our earlier discussion and what will follow is that there are many holes in a critical component of what we as management researchers do and that the only way to begin plugging those holes is to come to grips with how well we have measured organizational performance and how that can be improved.

### *Triangulation and Longitudinal Analysis: A Reassessment of an Old Story*

There has been a long tradition that has called for both triangulation from multiple measures and the application of longitudinal analysis, both of which have had only a marginal effect on the management research literature. The review of articles in the appendix found that single measures, or single measures recorded over time, were used in 105 of the 213 papers. That slightly less than half of the empirical papers in the leading journals in management rely on the dimensionality of a single measure is a serious concern and justifies the need for further debate. Even where multiple measures were used, in only 33% of instances these were collected from multiple measurement sources (such as accounting and financial market data or from executive surveys and secondary sources) that allowed measurement error to be isolated. Only 9 studies used the broadest triangulation by adopting both objective and subjective measures. Longitudinal data were more common, with 48% of studies collecting data over time. However, these data were not used in the most effective manner, with many studies simply averaging performance figures or placing them in cross-sectional models. Sixty-five studies (including several population ecology articles) adopted models that allowed for time series properties, but only 16 of these had multiple measures. This is disheartening as these were relatively well-publicized conclusions of earlier reviews of performance measurement (see Chakravarthy, 1986; Venkatraman & Ramanujam, 1986).

*Triangulation.* Triangulation with multiple measures offers the advantage of simultaneously reducing measurement error and improving construct validity (Campbell & Fiske, 1959; Venkatraman & Ramanujam, 1987). This is, of course, conditional on the fact that the multiple measures are tapping the same theoretical domain. This allows triangulation to address Implications 1 and 2 by allowing for the concerns of multiple stakeholders and across heterogeneous contexts. Triangulation also maintains the robustness required in

**Table 5**  
**Measurement methods and methodological validation needed**

Rationale for Methodology (review implications)	Methodological Solution(s)	Present Knowledge and Validating Research Needed
<b>Implication 1:</b> Measuring performance requires weighing the relevance of performance to focal stakeholders.	triangulation of multiple measures	Present: Financial market and accounting measures are favored due to their importance to stockholders and managers (Dore, 2000; Jensen & Meckling, 1976). <i>Needed: (a) Research that shows which measures best address other stakeholders. (b) Research examining the importance of different stakeholders across heterogeneous environments.</i>
<b>Implication 2:</b> Measurement of performance must take into account heterogeneity of environments, strategies, and management practices.	triangulation of multiple measures and data envelopment analysis (DEA)	Present: Researchers use discipline-specific measures with their relationship to wider organizational performance being assumed. <i>Needed: (a) Research that systematically links these specific measures to the broader performance construct while retaining the reality that there are multiple paths to performance. (b) Research on how the internal incentive and measurement systems (such as balanced scorecards) operating in organizations influence the dimensionality of performance.</i>
<b>Implication 3:</b> Measurement of performance requires an understanding of the time series properties relating organizational activity to performance.	longitudinal data	Present: Performance measures should span sufficient time to overcome random noise but also be split into fine enough periods to observe variation in performance. There is growing coalescence around the need for a 10-year timeframe to overcome random variation (see Kirby, 2005). <i>Needed: Research examining the time series properties of phenomena of interest. This will provide a more systematic understanding of when finer time periods and lagged measures are needed.</i>
<b>Implication 4:</b> Performance measures should be sufficiently robust to cover the domain of organizational performance.	triangulation of multiple measures	Present: Studies use a narrow range of measures and favor objective measures. The incremental benefit of using multiple objective measures has been shown (Chen & Dodd, 1997). <i>Needed: Research on the additional explanatory power provided by using subjective and objective measures together.</i>
<b>Implication 5:</b> Measurement of performance requires an understanding of the relationship between measures.	nonparametric approaches: DEA	Present: Studies using multiple measures create an index or use factor analytic techniques. These impose an artificial dimensional structure that is unlikely to capture the dimensionality of performance. <i>Needed: Research applying nonparametric approaches, such as DEA, and comparisons of these against factor-analytic, structural equations and regression-based approaches.</i>

Implication 4. It is surprising that triangulation is rare in management research (Schriesheim, Powers, Scandura, Gardiner, & Lankau, 1993) and, when used, invariably relies on a reflective formulation where construct validity is akin to high reliability as measured by Cronbach's alpha (e.g., Nadkarni & Narayanan, 2007). This, less than subtly, flies in the face of the multidimensionality of performance because it is the independence of the dimensions that makes triangulation relevant. Hence, appropriate triangulation requires not just aggregation but also a theoretical understanding of how to triangulate the components of performance—something that has yet to be effectively addressed by any area of research.

The importance of this last point can be seen in the data presented in Tables 6 and 7. These data show the factors extracted from 10 performance measures spanning accounting, stock market, and mixed accounting/stock market approaches that covered 3,000 firms in 38 industries across 125 countries for 20 years (Devinney et al., 2009). The results are compelling and clear and illustrate the major problem with triangulated approaches based on factor analysis: They do not work effectively when the structure of the construct is multidimensional, possesses nonrecursive properties, and has complex interactions among items. It is unfortunate that these are exactly the properties possessed by organizational performance measures, which, as in Table 7, generate several factors each with a narrow coverage. In addressing Implications 1, 2, and 4, factor analysis violates Implication 5 by imposing an artificial structure. What is also important to understand is that the measures used in Tables 6 and 7 are more likely to be consistent and clear, unlike subjective measures where additional biases are introduced. The inclusion of subjective measures is likely to exacerbate problems with factor analytic approaches.

*Longitudinal analysis.* Extending one's measures to include longitudinal data (i.e., measures repeated over time) can be used to tap the time dependent nature of performance as well as serving to remove error. By selecting sufficiently short individual periods to observe changes in performance, while tracking this over a longer period of time, the conflicting needs of Implication 3 can be achieved. Using longitudinal data in this way abstracts away from the absolute level of performance and instead focuses attention on changes in performance, effectively controlling for time invariant error. Ailawadi et al. (2004) found that adopting this approach reduces the influence of common method errors, such as format effects. It also corrects for contextual firm-specific fixed effects (Boulding, 1990). Research suggests that a 10-year period is needed to validly identify high performance, with 15 years being preferable (Collins & Porras, 1994; Foster & Kaplan, 2001; Kirby, 2005). Collecting data over multiple time periods also allows the use of pooled data methods that can test for and account for shifting model parameters as well as those associated with the time series itself (Bowen & Wiersema, 1999). This insight into parameters provides additional information that assists in addressing Implication 5 (see Table 5).

### *Addressing the Dimensionality of Organizational Performance Through Nonparametric Means*

To date, nearly all performance measurement approaches are parametric and invariably aim at reducing the dimensionality of a set of items into a more easily interpretable, reflective



**Table 6**  
**Factor analysis of performance measures (structure matrix)**

Performance Measure	1	2	3	4
Profit margin	<b>0.408</b>	-0.001	0.199	<b>-0.922</b>
Return on shareholder funds	<b>0.827</b>	-0.018	0.025	-0.213
Return on total assets	<b>0.866</b>	0.005	0.055	-0.511
Return on capital employed	<b>0.900</b>	-0.005	0.039	-0.390
Cash flow to operating revenue	0.341	-0.002	0.185	<b>-0.933</b>
Return on sales	0.083	0.027	<b>0.896</b>	-0.275
Change in market capitalization	0.058	<b>0.939</b>	0.046	0.064
Total shareholder return	0.051	<b>0.935</b>	0.038	0.058
Sales growth	0.013	0.030	<b>0.917</b>	0.016
Tobin's <i>q</i>	<b>0.409</b>	0.238	0.100	0.263
<i>Eigenvalue</i>	3.442	1.820	1.702	1.066

Source: Devinney, Yip, and Johnson (2009).

Note: Oblimin rotation, loadings above 0.4 in bold.

**Table 7**  
**Component correlation matrix (oblimin rotation)**

Component	1	2	3	4
1	1.000			
2	0.097*	1.000		
3	0.081*	0.069*	1.000	
4	-0.207**	0.110**	-0.088*	1.000

Source: Devinney, Yip, and Johnson (2009).

\* $p < .05$ . \*\* $p < .01$ .

construct. As noted, this undermines the actual dimensionality by imposing an artificial measurement structure and weakens triangulation by leading to the generation of several factors each with a narrow coverage. To preserve underlying dimensionality, it is more tractable to operate at a disaggregated level and not impose a relationship between measures (unless, of course, one has a sound theoretical model informing you as to what the specific measure means, as in the case of Tobin's *q* and economic return).

From a theoretical perspective, the parametric approaches used in the literature are based on central tendencies (or, in the case of survival, on specific distributional specifications). In other words, for most studies, high performance is based on a mathematical averaging of a set of underlying measures against an assumed distribution of performance. However, in contrast to the usual comparisons against "average" performance, it could be argued quite compellingly that resource-based theories of strategic advantage are actually based on the notion of dominance (e.g., Barney, 1991; Devinney, Midgley, & Venaik, 2001). According to Devinney et al. (2009),

A firm “strong-form dominates” (or outperforms) a set of other firms when it does better than all those firms on *all of the components* of the set of performance indicators. . . . Any firm “weak-form dominates” a set of other firms when it does better than all those firms on *at least one component* of a set of performance indicators. . . . Any firm outperforms (in terms of linear dominance) another set of firms when there is no linear combination of those other firms that can do better across all dimensions in the set of performance indicators.

The idea of dominance leads one to the formulation of a frontier of performance that is theoretically structured to match with nonparametric linear programming approaches such as Data Envelopment Analysis (DEA; Charnes, Cooper, & Rhodes, 1978). By allowing the relationship between the measures to be based on their observed nature, DEA avoids making the assumptions that create the problems associated with Implication 5. This also allows the model to retain natural heterogeneity, addressing Implication 2. As DEA is a multiple input–multiple output method, it theoretically can account for multidimensionality (Yip, Devinney, & Johnson, 2008).

Research has shown that such nonparametric techniques can not only represent the multidimensional nature of performance in a superior fashion to the traditional parametric alternatives (Devinney et al., 2009) but also provide many distinctive practical advantages relative to regression-based approaches (Thanassoulis, 1993). Feroz, Kim, and Raab (2003) showed that DEA approaches can be used to simultaneously extract information from accounting ratios without making comparisons “one ratio at a time” and avoiding ad hoc aggregation of different performance measures. The method can be further strengthened by the inclusion of classification information. Cook and Bala (2007) discuss a two-stage DEA process that is able to assign cases to separate groups. This can allow for discontinuous heterogeneity. For instance, this would allow discontinuities in environmental conditions (e.g., between institutional environments) or strategic groups (i.e., between groups of firms with relatively homogeneous assets and strategies) to be specified in the model.

### *A Call for More Concern About Performance Measurement*

The above discussion and the summary in Table 5 emphasize the need for a greater questioning into the nature of performance measurement. There are five findings that follow that we put out as a call for more research questioning how we address our ultimate dependent variable.

First, we need *theoretically stronger discipline-specific measures* that address the relationship between organizational practices and organizational performance. To date, we assume that our measures of performance matter and are appropriate. Unlike our independent variables (on which we form hypotheses and that are the focus of our tests and theories), we do not justify why we are using particular dependent variables and why they are the most appropriate dependent variables rather than the most conveniently available in COMPUSTAT. Second, we require research that *systematically links the performance measures used to a broader construct of sustainable organizational performance* in line with extant theories of strategic advantage. These theories argue that (a) sustainable performance is possible and

(b) there are multiple paths to such performance. Third, we require more effective research examining *the cross-sectional and time-series properties of performance and the generation of established recognized benchmarks*. Unlike finance, we have no established methods or measures that are replicated and benchmarked and, hence, no basis on which to compare research findings. Fourth, we require research that addresses the relationship between *different levels of analysis and different methods*, particularly subjective versus objective measures and business unit, subsidiary, and corporate level performance. Fifth, we require research into the application of *new and/or different mathematically based approaches* to measurement. To date, management research on performance has been locked into three methodological paradigms: sociology (survival analysis), psychology (mainly applying psychometric techniques), and economics (econometrics). These are restrictive in the sense that they derive from disciplinary-based assumptions about individual and firm behavior that is accepted rather than tested.

## Conclusion

Organizational performance is important to scholars across the entire domain of management research. Strategy and accounting scholars seek to influence and measure organizational performance. Scholars in marketing, operations, and human resource management seek to understand and improve performance. In doing so, they each adopt discipline-specific measures such as customer satisfaction, productivity, and employee satisfaction (see Chenhall & Langfield-Smith, 2007). Understanding how such discipline-specific measures load onto the dimensions of organizational performance and the interrelationships between specialist measures is essential to understanding the relationships between multiple organizational actions. This makes the valid measurement of an overarching performance construct important in allowing researchers in fields such as strategy, marketing, and human resource management to appreciate the linkages between the phenomena they study.

This review identifies that any study that claims to address organizational performance must include strong theory that addresses two key issues: (a) the dimensionality of performance (i.e., establishing which measures are appropriate to the research context) and (b) the selection and combination of performance measures (i.e., establishing which measures can be usefully combined and the method of doing so). The first inquiry is about the nature of performance and the second is about the nature of measurement. To be strong, the theoretical rationale for an approach to performance measurement must be both comprehensive in its assessment and rigorous in validation. To be comprehensive, the theoretical rationale for the performance measures used in a research study must ensure that each of the five implications drawn from this review is addressed. Validation in turn requires empirical evidence proving that methods used to create the measures and the measures themselves possess stable and expected properties appropriate to the theoretical structure.

Validating strong theory on the measurement of organizational performance is an important agenda for further research at both the theoretical and empirical levels. To a great degree, we have assumed that if we just had better data, we would be able to understand performance

better. This, we argue, is a fallacy. Even with better data, the multidimensionality of performance will imply that we need theory to help us understand how the dimensions go together. Similarly, as the link between the context and the measures is critical, we need to understand how the specific performance measures we use are influenced by the complex combination of context and actions over time. As it is unlikely that objective measures alone will capture this, we require research on those combinations of subjective and objective measures that best capture performance, over what time period fluctuations in performance appear, and most important, a broader exploration of the paths that link heterogeneous environments, and firm characteristics, practices, and strategies, to overall organizational performance.

In the end, this review aims to provide not just an overview of what we know about performance as a dependent variable but what we don't know. What we don't know and how we address our ignorance will determine whether or not management research succeeds. For without the ability to link managerial prescriptions based on theory to practical and observable and justifiable performance outcomes, management research will be little more than informed speculation or, as *The Economist* ("Business Schools and Research," 2007) points out, "practically irrelevant."

## Appendix

### Performance Measures in *Academy of Management Journal* (AMJ), *Administrative Science Quarterly* (ASQ), *Journal of International Business Studies* (JIBS), *Journal of Management* (JOM), and *Strategic Management Journal* (SMJ) 2005-2007

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Arthaud-Day, Certo, Dalton, & Dalton 2006	director and executive turnover after financial restatements	secondary	232 U.S. firms in matched pairs	control	return on assets, shareholder return including dividends, sales growth	objective	multiple (measures)	AMJ
Arthur & Huntley, 2005	deliberate learning and organizational performance	secondary	41 months of data from one manufacturing plant	dependent	cost per unit	objective	time series	AMJ
Barrick, Bradley, Kristof-Brown, & Colbert, 2007	top management team interdependence and performance	secondary	94 credit unions	dependent	net worth to total assets, delinquent loans to total loans, net charge-offs to average loans, return on average assets	objective	aggregated (averaged)	AMJ
Beckman, 2006	founding team affiliations, exploration, exploitation, and performance	survey and secondary	141 young high-technology firms	dependent	firm employee growth (effectiveness)	objective	time (multiple periods)	AMJ

(continued)

## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Canina, Enz, & Harrison, 2005	co-location and differentiation within competitive structures	secondary	14,995 U.S. lodging establishments that report to independent industry research body	dependent	revenue per available room (RevPAR)	objective	single	AMJ
Chen, Su, & Tsai, 2007	awareness, motivation, and capability in competitive dynamics	survey and secondary	13 major airlines in the period 1989 to 1992	control	passenger load factor (effectiveness)	quasi-objective	single	AMJ
Collins & Smith, 2006	HR practices and social climate influence creation and performance	survey and secondary	136 high-technology firms in two U.S. cities	dependent	revenue from new products, 1-year sales growth	objective and subjective	multiple (measures)	AMJ
Fiss & Zajac, 2006	the framing of strategic change	secondary	data on 112 of Germany's largest firms from 1990 to 2000	dependent, control	return on assets, shareholder return including dividends	objective	multiple (measures), time series	AMJ
Gardner, 2005	competition over human resources	survey	661 respondents drawn from an industry listing of U.S. firms	control	relative NPAT, sales growth, market share growth	subjective	aggregated (factored)	AMJ

(continued)

**Appendix (continued)**

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
George, 2005	resource slack and performance in private firms	secondary	900 privately held firms from a database	dependent	gross profit	objective	time series	AMJ
Geyskens, Steenkamp, & Kumar, 2006	meta-analysis of transaction cost theory	survey and secondary	557 correlations from 200 studies with 209 independent samples	dependent	cost-inclusive performance measures (profit, abnormal stock returns and cost-exclusive measures (sales)	objective and subjective	multiple (measures), time (multiple periods)	AMJ
Haleblian, Kim, & Rajagopalan, 2006	acquisition experience and performance and future acquisitions	secondary	2,523 acquisitions by 579 listed banks	independent	abnormal stock return for 5 days before and 15 days after announcement	objective	single	AMJ
Hillman, Shropshire, & Cannella, 2007	predictors of women on corporate boards	secondary	950 largest listed U.S. firms for 9,722 firm-year observations	control	standard deviation in daily stock returns, Tobin's <i>q</i> , total shareholder return, return on assets, debt-to-equity ratio	objective	multiple (measures), time series	AMJ
Hitt, Bierman, Uhlenbruck, & Shimzu, 2006	human and relational capital and internationalization	secondary	412 firm-year observations for 72 of the largest law firms in the U.S.	dependent	ratio of net income to revenue (return on sales)	objective	time (multiple periods)	AMJ

(continued)

## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Hoang & Rothaermel, 2005	alliance experience and R&D performance	survey and secondary	158 R&D joint venture projects in the period 1980 to 2000	dependent	project success (FDA or EMEA approval)	objective	single	AMJ
Jansen, Van den Bosch, & Volberda, 2005	organizational antecedents to absorptive capacity	survey and secondary	462 organizational units in a large financial services firm	control	profitability achieved rate (return on investment divided by expected return on investment)	objective	time (multiple periods)	AMJ
Kacmar, Andrews, Van Rooy, Steilberg, & Cerrone, 2006	effect of turnover on unit performance	secondary	262 Burger King restaurants	dependent	average monthly sales, operating profit	objective	aggregated (averaged)	AMJ
Kim & Miner, 2007	learning from the failure and near-failure of rivals	secondary	2,696 banks operating between 1984 and 1998	dependent, independent	hazard rate, index of capital risk, asset quality, management, earnings, and leverage (effectiveness)	objective and subjective	time series	AMJ
Krishnan, Martin, & Noorderhaven, 2006	moderation of the trust-performance relationship by uncertainty	survey	126 senior executives on Indian firms with international alliances	dependent	local and foreign partner satisfaction with overall and financial performance, partner goal satisfaction	subjective	aggregated (averaged)	AMJ
Kroll, Walters, and Le, 2007	impact of board composition and ownership on post-Initial Public Offering (IPO) performance	secondary	524 initial public offerings	dependent, control	2-year holding period return, logarithm of sales growth	objective	aggregated (averaged)	AMJ

(continued)



Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Lavie & Rosenkopf, 2006	balancing of exploration and exploitation	secondary	between 252 and 337 U.S. software firms from 1985 to 2001	control	return on assets	objective	time series	AMJ
Lavie, Lechner, and Singh, 2007	benefits to partners in multipartner alliances and the dynamics of partner entry	survey	227 partner firms that joined the Wi-Fi alliance	dependent	market success, productivity, and market exposure (both effectiveness)	subjective	single	AMJ
Li & Hambrick, 2005	factional differences as a source of conflict and poor performance	survey	513 surveys from managers across 71 joint ventures	dependent, control	JV performance, JV relative performance	subjective	multiple (measures)	AMJ
Lounsbury, 2007	practice diffusion for mutual funds	secondary	15,790 fund year observations from 1944 to 1985	independent	change in net asset value minus mean performance	objective	time (multiple periods)	AMJ
Luo, 2005	perceptions of procedural justice in alliances	survey and secondary	124 government-registered cross-cultural alliances in China	dependent	return on investment	objective	aggregated (time averaged)	AMJ
Luo, 2007	perceptions of justice and alliance performance	survey	127 alliances in China for which both local and foreign responded	dependent	average annual sales divided by total assets	subjective	time (multiple periods)	AMJ

(continued)

## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Miller & Eden, 2006	local density and foreign subsidiary performance	secondary	83 bank subsidiaries for 332 firm-year observations	dependent	return on assets	objective	time (multiple periods)	AMJ
Sanders & Tuschke, 2007	adoption of stock option pay in Germany	secondary	89 DAX100 firms from 1996 to 2000	control	return on assets	objective	time (multiple periods)	AMJ
Sanders & Hambrick, 2007	CEO stock options, risk taking, and performance	secondary	950 randomly selected mid-cap and small-cap U.S. firms	dependent, control	deviation from expected total shareholder return and return on assets	objective	multiple (measures), time series	AMJ
Schneider, Ehrhart, Mayer, Saltz, & Niles-Jolly, 2005	customer linkages in service organizations	survey and secondary	56 supermarket departments	dependent	sales per quarter per employee	objective	single	AMJ
Shaw, Duffy, Johnson, & Lockhart, 2005	turnover, social capital, and performance	survey and secondary	38 restaurants from a single chain	dependent	sales per employee, change in sales per employee, sales growth	objective	multiple (measures)	AMJ
Shaw, Gupta, & Delery, 2005	effect of staff turnover on performance	survey and secondary	299 medium- to large-size U.S. trucking firms over 2001 to 2002	dependent	operating ratio and return on equity	objective	multiple (measures), aggregated (time averaged)	AMJ

(continued)

Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Shimizu, 2007	individual and organizational influences on divestiture decisions	secondary	68 U.S. public firms that acquired another U.S. firm and divested it between 1988 and 1998	dependent, control	return on assets minus the mean industry return on assets	objective	time series	AMJ
Shipilov, 2006	performance of banks in the presence of structural holes	secondary	9,357 issues by 228 investments banks from 1952 to 1990	dependent, control	market share (IPO deal value as proportion of industry total)	objective	time (multiple periods)	AMJ
Simsek, Veiga, Lubatkin, & Dino, 2005	determinates of top management team behavioral integration	survey	402 small business firms over a 2-year period (two surveys)	independent	relative growth in sales revenue, net profit, shareholder return	subjective	aggregated (factored)	AMJ
Sine, Mitsuhashi, & Kirsch, 2006	formal structure and new ventures in turbulent markets	survey	1,049 firm-year observations across 449 Internet firms	dependent	sales	quasi-objective	time (multiple periods)	AMJ
Steensma, Tihanyi, Lyles, & Dhanaraj, 2005	effect of foreign parents on joint ventures in transitioning economies	survey	225 Hungarian joint ventures sampled from government list	dependent	relative performance as rated by the Hungarian parent, foreign parent, and the respondent, rating on last year's change in business volume, unit costs, market share, employee productivity, overhead costs, achievement of planned goals, and profits	subjective	aggregated (factored)	AMJ

(continued)

**Appendix (continued)**

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Subramaniam & Youndt, 2005	human and social capital and innovative capability	survey and secondary	93 executives from a commercial directory	control	return on equity and return on assets	objective	aggregated (averaged)	AMJ
Sun, Aryee, & Law, 2007	high-performance HR practices and performance	survey	81 hotels in Eastern China	dependent	logarithm of sales per employee, annual staff turnover (effectiveness)	quasi-objective	single	AMJ
Tsang & Yip, 2007	survival of foreign direct investments (FDIs)	secondary	1,373 FDIs in 42 countries	dependent	survival (logarithm of the hazard rate)	objective	time series	AMJ
von Nordenflycht, 2007	ownership, performance, and creativity for professional services firms	secondary	122 U.S.-based advertising agencies from 1960 to 1980	dependent, control	Percentage annual change in sales, 3-year compound growth	objective	time series	AMJ
Vroom & Gimeno, 2007	ownership form, managerial incentives, and pricing under competition	secondary	12,069 quarterly observations across 630 hotels of 28 hotel brands in Texas	dependent	revenues per available room, price (effectiveness)	objective	time series	AMJ
Wade, Porac, Pollock, & Graffin, 2006	effect of CEO awards on CEO pay and firm performance	secondary	278 <i>Fortune</i> 500 companies with 31 December fiscal year end	dependent	excess market return on day of announcement, shareholder including dividend, return on equity	objective	multiple (measures), time (multiple periods)	AMJ

(continued)

### Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Wu, Levitas, & Priem, 2005	innovation performance, CEO tenure in technological environments	secondary	339 firm-year observations across 84 firms	control	Tobin's $q$	objective	time (multiple periods)	AMJ
Zatzick & Iverson, 2006	moderation of layoffs on high-involvement workplaces on productivity	survey	3,080 Canadian workplaces	dependent	logarithm of revenues minus expenses per employee	quasi-objective	time (multiple periods)	AMJ
Chatterjee & Hambrick, 2007	effect of CEO narcissism on firm strategy and performance	secondary	111 CEOs in 105 unique firms across 352 firm years	dependent, control	change in and industry-adjusted total shareholder returns (including dividends) and return on assets	objective	multiple (measures), time series	ASQ
Chuang, 2005	acceptance of risk and uncertainty based on distance from performance aspirations	secondary	375 Canadian investment banks' underwriting syndicates 1952-1990	independent	market share using the value of the syndicates in which it participated in, eigenvector centrality (effectiveness)	objective	time series	ASQ

(continued)

**Appendix (continued)**

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Gómez-Mejía, Takács Haynes, Núñez-Nickel, & Jacobson, & Moyano-Moyano, 2007	risk in family-controlled firms	secondary	1,237 family-owned olive oil mills in southern Spain during a 54-year period	dependent, independent	hazard rate (survival), logarithm of olives sold at $t + 1$ over olives sold at $t$ (effectiveness), logarithm of percentage difference in olives sold to average sold by similar oil mills (effectiveness)	objective	multiple (measures), time series	ASQ
Gulati & Syrch, 2007	dependence in interorganizational procurement relationships	survey	151 observations for relations with 113 unique suppliers	dependent	price competitive, support and services, flexibility in production, product quality, product innovations, average past target-price ratio, average price-change ratio, average defect rate, improvement in average defect rate (all effectiveness)	subjective	aggregated (factored)	ASQ

(continued)

## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
King & Soule, 2007	effect of activist protests on stock price returns	secondary	342 activist protests against U.S. corporations during 1962 to 1990	dependent	cumulative abnormal stock market return (CAR) to a company's stock price	objective	single	ASQ
Luo & Chung, 2005	performance effect of network ties during market transition	secondary	688 cases from 188 Taiwanese business groups	dependent	return on assets	objective	time (multiple periods)	ASQ
Mezias & Boyle, 2005	legal institution and population dynamics in the U.S. film industry	secondary	1,111 film-producing firms active from 1893 to 1920	dependent	survival	objective	time series	ASQ
Westphal & Bednar, 2005	biases against strategic action in low performing firms	survey and secondary	228 boards of mid-size U.S. public companies	independent	return on equity	objective	multiple (measures), aggregated (averaged)	ASQ
Westphal & Stern, 2006	interpersonal influence and board appointments	secondary	3,251 dyadic combinations of managers and boards for 1,012 firms	independent	log of sales and industry-adjusted market-to-book value	objective	multiple (measures), time series	ASQ
Baggs & Brander, 2006	trade liberalization, profitability, and financial leverage	secondary	284,000 observations on 53,000 Canadian manufacturing firms from 1989 to 1997	dependent	taxable corporate income	objective	time series	JIBS

(continued)

## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Banga, 2006	export diversification due to FDI in a developing country	secondary	1,448 firms in the nontraditional export sector	control	profitability (gross profit over sales), log of sales (size)	objective	time series	<i>JIBS</i>
Barden, Steensma, & Lyles, 2005	parental control and parental conflict	survey	75 Vietnamese international joint ventures in 1998	control	performance assessment of Vietnamese parent, foreign parent, and manager	subjective	aggregated (factored)	<i>JIBS</i>
Barkema & Drogendijk, 2007	approaches to sequential internationalization	survey	99 Dutch subsidiaries operating in central and eastern Europe between 1989 and 1998	dependent	relative sales level, market share, profitability, reputation, and overall performance compared to expectations	subjective	aggregated (factored)	<i>JIBS</i>
Carrieri & Majerbi, 2006	pricing of exchange risk in emerging stock markets	secondary	105 firms from seven emerging economies	independent	market returns	objective	time series	<i>JIBS</i>
Chan, Makino, & Isobe, 2006	prior entry and exit, and foreign market entry	secondary	4,349 market entry decisions that were made by Japanese electronics multinational enterprises (MNEs) during 1989 to 1998	independent	prior exit (survival)	objective	time series	<i>JIBS</i>

(continued)



## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Click, 2005	country and political risk	secondary	U.S. direct foreign investments over the period 1982 to 1998 in 59 host countries	dependent	aggregate return on assets	objective	time series	<i>JIBS</i>
Del Sol & Kogan, 2007	Chilean competitive advantage in Latin America based on pioneering economic reforms	secondary	165 foreign affiliates of Chilean public companies and 754 other Latin American public firms during 1994 to 2002	dependent	return on equity, dummy on whether profits were positive, return on assets	objective	multiple (measures), time series	<i>JIBS</i>
Doukas & Kan, 2006	risk reduction and the fall in shareholder value from diversification	secondary	612 cross-border acquisitions by U.S. firms in the period 1991 to 1997	dependent, independent	natural logarithm of bidder's market value relative to its imputed value, return on sales, Tobin's $q$	objective	multiple (measures), time series	<i>JIBS</i>
Dow, 2006	status quo bias and under-adaptation	survey	100 Australian exporters surveyed in 2001 and 2004	dependent	relative growth and profitability against domestic and host markets' competitors, against expectations and success	subjective	aggregated (factored)	<i>JIBS</i>

(continued)

## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Eden, Juarez Valdez, & Li, 2005	event study on the valuation of Japanese MNE on changes in transfer pricing regulation in the U.S.	secondary	24 Japanese MNE affiliates listed on NYSE or NASDAQ during 1989 to 1999	dependent, control	2-day and 3-day CAR, log of total sales, profit margin, BERRY Ratio (ratio of sales less costs of goods sold over selling and general expenses)	objective	multiple (measures), time (multiple periods)	<i>JIBS</i>
Ellis, 2007	market orientation and performance in relation to distance from markets	survey	345 Taiwanese exporters	correlation	rating of and satisfaction with relative sales growth, profits, return in investment and market share, sales, 3-year sales growth, operating margin	subjective and quasi-objective	multiple (measures)	<i>JIBS</i>
Flores & Aguilera, 2007	firm, industry, and regional influences on change in location choice for U.S. MNE	secondary	100 largest U.S. MNEs in 1980 and 2000	control	10-year return to investors	objective	aggregated (time-averaged)	<i>JIBS</i>

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Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Gong, Shenkar, Luo, & Nyaw, 2005	human resource systems and international joint venture performance	survey	265 China-based international joint ventures	dependent	foreign and local parent satisfaction on sales level, market share, profitability, reputation, cost leadership, management of venture, technology development, product design, quality management, labor productivity, marketing, distribution, customer service, and involvement (last 10 effectiveness)	subjective	aggregated (factored)	<i>JIBS</i>
Griffith & Myers, 2005	the fit of relational norm governance and performance	survey	92 global supply chain relationships between U.S. importers and their primary Japanese and U.S. supply chain partners	dependent	relative sales growth, profit growth, and overall profitability	subjective	aggregated (factored)	<i>JIBS</i>

(continued)

**Appendix (continued)**

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Luo, 2006	corruption and social responsibility	survey and secondary	126 senior managers from MNE subsidiaries in China	dependent, control	corporate social performance including reputation, product customization and relationship, sales	objective and subjective	single	<i>JIBS</i>
Luthans & Ibrayeva, 2006	entrepreneur self-efficacy and performance	survey	85 Kazakhstan and 58 Kyrgyzstan entrepreneurs in retail services and manufacturing	dependent	perceived organizational effectiveness (effectiveness), profit margin, and sales growth	subjective	multiple (measures)	<i>JIBS</i>
Lyles & Salk, 2007	knowledge acquisition by international joint ventures	survey	201 small and medium-sized international joint ventures in Hungary	dependent	achievement of business volume, increasing market share, achieving planned goals, and making profits, Hungarian parent, foreign parent, and manager rating of performance	subjective	multiple (measures), aggregated (factored)	<i>JIBS</i>
Meschi, 2005	stock market performance implications of joint venture sell-offs	secondary	151 European firms that sold joint venture assets between 1994 and 2002	dependent	±10-day, ±5-day, ±2-day, and ±1-day CARs	objective	multiple (measures), time (multiple periods)	<i>JIBS</i>

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Mudambi & Zahra, 2007	comparison of the survival of international new ventures and other forms of entry	survey and secondary	275 non-U.K. firms operating in Britain in 1992	dependent	survival	objective	time (multiple periods)	<i>JIBS</i>
Murray, Kotabe, & Zhou, 2005	innovation, uncertainty, alliances, and performance	secondary	non-Chinese executives of 230 foreign-funded manufacturing enterprises in China	dependent	relative sales growth and return on sales over past 3 years	subjective	aggregated (factored)	<i>JIBS</i>
Nadkarni & Perez, 2007	managerial mind-sets and internationalization	secondary	212 publicly listed U.S. firms over 1987 to 1989	control	return on investment, sales, operating profit, market share	objective	multiple (measures), aggregated	<i>JIBS</i>
Nadolska & Barkema, 2007	experience and the pace and success of foreign acquisitions	secondary	25 nonfinancial firms listed on the Amsterdam stock exchange from 1966 to 1998	dependent, control	survival, return on assets	objective	multiple (measures), time series	<i>JIBS</i>
Newbury, Gardberg, & Belkin, 2006	attractiveness of foreign companies	secondary	4,605 individual evaluations across 60 U.S. companies	control	return on assets, sales (size)	objective	single	<i>JIBS</i>
Oxelheim & Randøy, 2005	internationalization and CEO compensation	survey and secondary	90 Norwegian and 97 Swedish listed firms in 1997	control	return on equity, stock return, Tobin's <i>q</i> , market value (size)	objective	multiple (measures)	<i>JIBS</i>

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Park, Li, & Tse, 2006	market liberalization and firm performance in China	secondary	23,577 Chinese firms between 1992 and 1996	dependent, control	return on assets, labor productivity (sales per employee) (effectiveness), market share	objective	multiple (measures)	<i>JIBS</i>
Strike, Gao, & Bansal, 2006	socially responsible and socially irresponsible firms and diversification	secondary	2,442 observations for 222 U.S. firms for which there were Kinder, Lydenberg, and Domini (KLD) data over the research period 1993 to 2003	control	seven KLD items for corporate social performance (effectiveness), return on sales	objective	time series, aggregated (averaged)	<i>JIBS</i>
Tong & Reuer, 2007	international investments and risk	secondary	297 U.S. firms during 1990 to 1994	control	downside risk on return on assets and return on equity (effectiveness), return on assets	objective	aggregated (averaged)	<i>JIBS</i>
Tseng, Tansubaj, Hallagan, & McCullough, 2007	multinationality and firm knowledge-based and property resources	secondary	286, 257, 243, and 242 publicly listed U.S. manufacturing firms from 1995 to 2001	independent	return on investment, ratio of cash flow to invested capital	objective	multiple (measures), time (multiple periods), aggregated (averaged)	<i>JIBS</i>

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**Appendix (continued)**

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Venaik, Midgley, & Devinney, 2005	multiple subsidiary strategies and performance	survey	163 MNE subsidiaries across a range of industries in industrialized and industrializing countries	dependent	relative market share, sales growth, and return on investment over the past 3 years	subjective	aggregated (factored)	<i>JIBS</i>
Waldman, de Luque, Washburn, & House, 2006	predictors of corporate social responsibility values	survey and secondary	4,656 individuals from 561 firms in 15 countries	dependent, control	perceived effect on firm profitability, sales, employee relations issues, the environment, contribution to the economic welfare of the nation and welfare of the local community (all effectiveness), relative sales and return on investment	subjective and quasi-objective	aggregated (averaged)	<i>JIBS</i>
Weitzel & Berns, 2006	corruption and takeover premiums	secondary	4,979 publicly listed acquisitions in 42 countries between 1996 and 2003	control	market value (as complexity)	objective	single	<i>JIBS</i>
Wooster, 2006	U.S. company foreign expansion and shareholder wealth	secondary	300 U.S. manufacturing firms that expanded into transition economies during 1985 to 1999	dependent, independent	abnormal stock returns, return on assets	objective	time series	<i>JIBS</i>

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Wu, Sinkovics, Cavusgil, & Roath, 2007	governance in export channels in the presence of opportunism	survey	142 U.S. exporting manufacturers that use foreign distributors	independent	relative performance of distributor in profitability, customer responsiveness, responsiveness and market opportunities (last three effectiveness)	subjective	aggregated (factored)	<i>JIBS</i>
Yiu, Lau, & Bruton, 2007	international venturing by emerging economy firms	survey	274 Chinese manufacturing firms in 2003 and 2004	control	return on assets, sales growth	quasi-objective	multiple (measures)	<i>JIBS</i>
Zhang, Lim Hitt, & Cui, 2007	performance benefits from R&D for international joint ventures in the face of appropriability	secondary	243 Chinese international joint ventures in the electric machinery, electronics, and office equipment industries	dependent	industry-adjusted return on assets	objective	single	<i>JIBS</i>
Zhou, Brown, Dev, & Agarwal, 2007	moderation of competitor- and customer-orientation performance outcomes	survey	184 hotel locations in 56 countries	dependent	relative occupancy (effectiveness), gross operating profit, and market share	subjective	aggregated (factored)	<i>JIBS</i>

(continued)



Appendix (continued)

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Zhou, Tse, & Li, 2006	technical and administrative change and their effect on performance	survey and secondary	stratified sample of 3,960 employees in 180 firms	dependent, independent	return on assets	objective	aggregated (time <i>JIBS</i> averaged)	
Zhou, Wu, & Luo, 2007	information affects social networks on internationalization of small and medium enterprises (SMEs)	survey	129 SMEs located in China's economically developed eastern province of Zhejiang	dependent	export growth (i.e., export sales to total sales), industry-adjusted profitability growth, and total sales growth	quasi-objective	multiple (measures), aggregated (averaged)	<i>JIBS</i>
Arya & Lin, 2007	collaborative outcomes between not-for-profit firms	survey	52 not-for-profit networked organizations in Dallas, Texas	dependent	increase in funding, revenue, recruitment ability, employee retention, reputation, ability to meet client needs (effectiveness)	subjective	aggregated (factored)	<i>JOM</i>
Bhattacharya, Gibson, & Doty, 2005	employee skills, behaviors, and HR practices on firm performance	secondary	117 surveys from senior executives of firms in the industrial equipment and grocery industries	dependent	operating profit per employee, sales per employee, return on sales, cost of sales over sales (effectiveness)	objective	aggregated (averaged)	<i>JOM</i>

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Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Deckop, Merriman, & Gupta, 2006	CEO pay structure and corporate social performance	secondary	313 Standard & Poor's (S&P) 500 firms for which social responsibility, financial, and board data were available	dependent, control	KLD scores on employee relations, product quality, community relations, environment, human rights, and diversity (effectiveness), return on assets	objective and subjective	single	<i>JOM</i>
Deutsch, Keil, & Laamanen, 2007	outside director compensation and firm acquisition behavior	secondary	4,621 company years from 1,003 of the S&P 1500 firms between 1996 and 2002	control	return on assets	objective	single	<i>JOM</i>
Donoher, Reed, & Storrud-Barnes, 2007	managerial equity ownership, contingent compensation, and the restatement of misleading financial disclosures	secondary	171 firms that restated earnings during 1994 to 2003 and 171 matched firms based on industry, assets, and employees	independent	earnings-per-share, growth in sales, and market valuation	objective	multiple (measures), aggregated (averaged)	<i>JOM</i>

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Fey & Birkinshaw, 2005	knowledge sources, governance mode, and R&D performance	survey and secondary	107 R&D intensive firms in Sweden and Great Britain	dependent	relative performance getting new products to market, generating radical technologies, and bringing breakthroughs to market (effectiveness)	subjective	multiple (measures)	<i>JOM</i>
Flanagan & Shaughnessy, 2005	layoffs and firm reputation	secondary	782 firm-year observations from 347 firms between 1996 and 1998	dependent, independent, control	<i>Fortune</i> reputation based on corporate assets, social responsibility, staff attraction, innovation, long-term investment, management quality, product quality (effectiveness) and financial soundness, industry-adjusted return on assets, ratio of price to book value	subjective and objective	multiple (measures), time (multiple periods)	<i>JOM</i>
Gaur & Lu, 2007	effect of ownership, institutional difference, and host country experience on subsidiary survival	secondary	20,177 overseas Japanese subsidiaries from 1986 to 2001	dependent	survival	objective	time series	<i>JOM</i>

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Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Gaur, Delios, & Singh, 2007	host country institutional environments, subsidiary staffing and performance	secondary	12,997 foreign subsidiaries of 2,952 Japanese firms in 48 countries	dependent	labor productivity (industry-adjusted sales per employee) (effectiveness)	objective	single	JOM
George, Wiklund, & Zahra, 2005	effect of internal ownership on internationalization of small firms	survey	889 Swedish SMEs from manufacturing, professional services, wholesale/retail, and other services industries	control	relative net profit, relative cash flow, and relative growth in net worth, number of profitable years in past 5	subjective and quasi-objective	multiple (measures), aggregated (averaged)	JOM
Gnyawali, He, & Madhavan, 2006	competitive behavior in a cooperative network	secondary	45 major steel-producing firms from the U.S., Europe, Asia, and Australia during 1995 to 1996	control	return on assets	objective	time (multiple periods)	JOM
Grossman & Cannella, Jr., 2006	stability of corporate strategy and executive compensation	secondary	245 observations for 100 firms from the S&P 500 from 1992 to 1994	independent	return on assets (adjusted for industry growth rate)	objective	time (multiple periods)	JOM
Hillman, 2005	politicians as board members and industry regulation	secondary	300 U.S. firms, with half from highly regulated and half from low regulation industries	dependent, control	market capitalization, market-to-book value, return on assets, and return on sales	objective	multiple (measures)	JOM

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## Appendix (continued)

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Ling, Zhao, & Baron, 2007	founder-CEO values and start-up firm performance	survey	92 SMEs from a New England region in 2004	dependent	relative performance on eight items from Gupta & Govindarajan (1986) including growth in sales, growth in market share, return on equity, and return on total assets	subjective	aggregated (factored)	<i>JOM</i>
Lu & Xu, 2006	legitimacy and the survival of international joint ventures	survey and secondary	291 Sino-Japanese joint ventures in China from 1986 to 2001	dependent	sales growth, survival	objective	multiple (measures), time series	<i>JOM</i>
Lubatkin, Simsek, Ling, & Veiga, 2006	management behavioral integration and SME ambidexterity	survey	139 SMEs from the New England region of the U.S.	dependent, control	relative performance on eight items from Gupta & Govindarajan (1986) including growth in sales, growth in market share, return on equity, and return on assets	subjective	multiple (measures)	<i>JOM</i>
Matusik & Heeley, 2005	absorptive capacity in the software industry	survey	293 U.S. firms in the prepackaged software industry that make software for Windows	control	relative firm profitability	subjective	single	<i>JOM</i>

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Neubaum & Zahra, 2006	effect of institutional ownership on corporate social performance	secondary	357 and 383 firms from the 1993 and 1998 <i>Fortune</i> 500 lists based on data availability	dependent, control	KLD scores on employee relations, the environment, community relations, product characteristics, treatment of women and minorities (effectiveness), return on assets	subjective and objective	aggregated (averaged)	<i>JOM</i>
Shimizu & Hitt, 2005	divestiture of acquired firms	secondary	70 U.S. public firms acquired by another U.S. firm and divested between 1988 and 1998	independent, control	industry-adjusted return on assets, change in industry-adjusted return on assets	objective	time series	<i>JOM</i>
Warner, Fairbank, & Steensma, 2006	timing of acquisitions as real options prior to standards being established	secondary	163 acquisitions in the information and telecommunication industry in the period 1995 to 2000	control	month-end price/earnings ratio	objective	single	<i>JOM</i>
Yoshikawa, Phan, & David, 2005	ownership structure and human capital investments by Japanese firms	secondary	4,980 observations on 996 publicly traded Japanese manufacturing firms from 1998 to 2002	independent	return on assets	objective	time series	<i>JOM</i>

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Zhang, George, & Chan, 2006	social identities of local managers in MNE subsidiaries and their turnover intentions	survey	159 MNE consumer product subsidiaries in China in 2000	control	relative return on investment, sales growth, profit level, and market share	subjective	aggregated (factored)	JOM
Acquaah, 2007	effect of managerial social capital derived from networking relationships and personal ties on performance	survey	106 senior executives of manufacturing and service firms operating in Ghana	dependent	relative sales growth, net income growth, return on assets, return on sales, productivity growth	subjective	multiple (measures), aggregated (averaged)	SMJ
Ahuja, Coff, & Lee, 2005	insider trading by managers and firm patents	secondary	1,269 publicly traded U.S. firms that received patent approval between 1988 and 1990	control	market-to-book ratio	objective	single	SMJ
Andersen, Denrell, & Bettis, 2007	strategic responsiveness and the risk-return paradox	secondary	4,365 firms in 45 industries during 1991 to 2000	independent	return on assets, return on equity	objective	multiple (measures), time (multiple periods)	SMJ
Arend, 2006	upstream vertical alliances and perceptions in SME performance	survey	421 senior managers at 200 U.S., Mexican, and European manufacturing and service firms	dependent	relative return on assets, relative market share, relative product quality, relative competitive position, and relative customer service (effectiveness)	subjective	multiple (measures)	SMJ

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Bansal, 2005	organizational determinants of corporate sustainable development	secondary	45 firms from Canada's forestry, mining, and oil and gas industries	control	return on equity	objective	time series	SMJ
Barkema & Shvytkov, 2007	top management team diversity and foreign expansion	secondary	expansions of 25 large, nonfinancial Dutch firms from 1966 to 1998	control	return on assets	objective	time series	SMJ
Barnett & Salomon, 2006	corporate social responsibility and financial performance	secondary	61 social responsibility investment funds and 4,821 fund-month observations from 1972 to 2000	dependent	percentage change market value per month	objective	time series	SMJ
Basdeo, Smith, Grimm, Rindova, & Derfus, 2006	market action complexity and range, rivals' responses and firm reputation	survey and secondary	215 firm-year observations of 37 firms in 10 industries that spanned manufacturing, services, and retailing	dependent, control	ratings of innovation, financial soundness, employee talent, use of corporate assets, long-term investment value, social responsibility, quality of management, and quality of products, return on assets	objective and subjective	time series, aggregated (averaged)	SMJ
Bercovitz & Mitchell, 2007	effect of scale and scope on long-term business survival	secondary	618 firms in the U.S. medical sector between 1978 and 1995	dependent, independent, control	return on total sales, difference between return on total sales and historical return on total sales	objective	multiple (measures)	SMJ

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## Appendix (continued)

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Berry, 2006	international experience and management capabilities in the valuation of risky foreign investments	secondary	191 U.S. manufacturing firms and their foreign investments over a 20-year period (1981–2000)	dependent, control	Tobin's $q$ adjusted for GDP inflators, 2-year change in sales	objective	time series	<i>SMJ</i>
Bou & Satorra, 2007	persistence of abnormal returns at the firm and industry levels, and their permanent and transitory components	secondary	5,000 Spanish firms observed over the period 1995 to 2000	dependent	abnormal return on assets	objective	time series	<i>SMJ</i>
Bowen & Wiersema, 2005	diversification strategy and foreign competition	secondary	8,961 firm-year observations of U.S. firms from 1985 to 1994	independent	industry growth, industry average return on assets, profit margin	objective	multiple (measures), time (multiple periods)	<i>SMJ</i>
Cantwell & Mudambi, 2005	determinates of R&D intensity in subsidiaries	survey	225 responses from U.K.-based engineering and engineering-related subsidiaries of foreign firms	independent, control	sales (size), abnormal rate of return (subsidiary ROR minus parent ROR)	quasi-objective	single	<i>SMJ</i>

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Capron & Shen, 2007	private information, target selection, and returns on acquisition of public and private firms	survey and secondary	92 manufacturing firms in the U.S., U.K., and France that acquired 40 private and 52 public companies	dependent, control	abnormal stock return for 20 days before and 10 days after announcement, target pre-merger profitability	objective and subjective	single	SMJ
Chacar & Vissa, 2005	persistence of performance in developed and emerging economies	secondary	25,509 observations from 4,325 manufacturing firms in India and 31,600 observations from 4,562 manufacturing firms in the U.S. from 1989 to 1999	dependent, independent	return on assets normalized against the economy and three-digit Standard Industrial Classification (SIC) industry	objective	multiple (measures), time series	SMJ
Chakrabarti, Singh, & Mahmood, 2007	effect of diversification on performance for firms operating in different institutional environments during stable and turbulent periods	secondary	3,117 firms; in 19 manufacturing industries in six East Asia countries (Indonesia, Japan, Malaysia, Singapore, South Korea, and Thailand) during 1988 to 2003	dependent	return on assets	objective	time (multiple periods)	SMJ

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Chen & Miller, 2007	R&D search intensity, institutionalized search and firm attention to performance aspirations, bankruptcy, and slack	secondary	35,970 observations of U.S. manufacturing firms from 1980 to 2001	independent	return on assets, Altman's Z	objective	multiple (measures), time series	SMJ
Cho & Pucik, 2005	relationship between innovativeness, quality, growth, profitability, and market value at the firm level	survey and secondary	488 U.S.-based businesses from the Fortune Reputation Survey	dependent, independent	growth in total assets, growth in total revenues, growth in market capitalization, return on assets, return on common equity, return on invested capital, market-to-book ratio, Tobin's q, reputation for innovativeness, reputation for quality of products (last two effectiveness)	subjective and quasi-objective	multiple (measures)	SMJ
Cho & Shen, 2007	changes in top management team compensation following an environmental shift	secondary	30 listed firms in the airline industry with annual sales of at least \$100 million that operated between 1973 and 1986	control	return on equity	objective	time series	SMJ

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## Appendix (continued)

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Cohen & Dean, 2005	top management team legitimacy and post-initial public offering performance	secondary	random sample of 221 U.S. IPOs executed from January 1, 1998, through December 31, 1999	dependent, control	percentage stock price change 2 weeks after IPO, net income	objective	multiple (measures)	SMJ
Collis, Young, & Goold, 2007	how the size of a company, corporate strategy, and governance system affects corporate headquarters and their performance	survey and secondary	more than 600 headquarters in Europe, the U.S., Japan, and Chile	independent	return on capital employed, total shareholder return, growth in sales turnover, overall effectiveness and cost-effectiveness (last two effectiveness)	objective, quasi-objective	multiple (measures), aggregated (averaged)	SMJ
Coombs & Gilley, 2005	effects of stakeholder management on CEOs' compensation in the presence of financial performance variation	survey and secondary	406 firms and their CEOs for which data were available on EXECUCOMP, COMPUSTAT, and KLD database over 1995 to 2001	independent	return on assets, total shareholder return, rating on community diversity, employee relations, environment, and product quality	objective and subjective	multiple (measures), time series	SMJ

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## Appendix (continued)

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Crossland & Hambrick, 2007	CEO effects on performance across three different country institutional environments	secondary	15-year matched samples of 100 U.S. firms, 100 German firms, and 100 Japanese firms	dependent	return on assets, return on sales, sales growth, market-to-book value	objective	multiple (measures), time series	SMJ
David, Bloom, & Hillman, 2007	relationships between shareholder activism, managerial response, and corporate social performance	survey and secondary	1,307 shareholder proposals in 218 firms	dependent, control	rating on community, diversity, employee relations, environment, and product quality, return on assets, Jensen's alpha, Tobin's $q$	objective and subjective	multiple (measures), aggregated (averaged)	SMJ
David, Yoshikawa, Chari, & Rasheed, 2006	effect of foreign ownership on strategic investments in Japanese corporations	secondary	146 of Japan's largest industrial firms observed from 1991 to 1997	control	return on assets	objective	time series	SMJ

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Desarbo, Di Benedetto, Song, & Sinha, 2005	the Miles & Snow (1978) types, strategic capabilities, environmental uncertainty, and performance	survey	549 firms from a stratified sample of 800 firms from China, Japan, and the U.S.	dependent, control	operating profit over total revenue, average return on investment, return on investment, return on assets, relative market share, customer retention (effectiveness), retention of major customers (effectiveness), sales growth rate, profit margin relative to objective, sales relative to objective, return on investment relative to objective for this business unit	subjective and quasi-objective	multiple (measures), aggregated (averaged)	SMJ
Dobrev, 2007	propensity to change market locations based on imitation and resource competition	secondary	all automobile producers to operate in the U.S. from 1885 to 1981	independent	survival (number of peers departing from segment)	objective	time series	SMJ

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Douma, George, & Kabir, 2006	effect of foreign institutional and corporate shareholders on the performance of emerging market firms	secondary	1,005 Indian locally owned firms listed on the Bombay Stock Exchange	dependent	return on assets, Tobin's $q$	objective	multiple (measures)	SMJ
Dowell & Swaminathan, 2006	entry timing, exploration, and survival	secondary	firms in the U.S. bicycle industry from 1879 to 1918	dependent	survival, adoption of dominant design (effectiveness)	objective	time series	SMJ
Dowell, 2006	product line breadth and survival	secondary	319 incumbents and 184 entrants in the U.S. bicycle industry	dependent	survival	objective	time series	SMJ
Dutta, Narasimhan, & Rajiv, 2005	stochastic frontier estimation (SFE) of firm capabilities and an application to R&D	secondary	64 publicly traded U.S. firms in the semiconductor and computer equipment industries from 1980 to 1998	dependent	Tobin's $q$	objective	single	SMJ
Ebben & Johnson, 2005	efficiency and flexibility strategies for small firms	survey and secondary	200 and 144 privately held manufacturing firms with sales of less than \$20 million	dependent	return on assets, return on invested capital, and return on equity	objective	multiple (measures)	SMJ

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Echols & Tsai, 2005	product and process distinctiveness, network embeddedness, and performance	secondary	80 U.S. venture capital firms that held investments in a total of 369 IPOs	dependent	number of IPOs with 12 months of above-average stock returns	objective	single	SMJ
Eisenmann, 2006	factors that determined the intensity of Internet companies' investments in growth and long-term performance	survey and secondary	117 U.S. focused pure play Internet firms	dependent, independent, control	return on invested capital, average variable contribution margins (revenue, less variable costs unrelated to customer acquisition efforts, divided by revenue), earnings before interest and taxes	objective	multiple (measures)	SMJ
Elbanna & Child, 2007	strategic decision-making processes, decision-specific, environmental, and organizational factors, and strategic decision effectiveness	survey	169 firms in nine industries including textiles and clothing, chemicals, and food and beverage	independent	relative financial, relative nonfinancial performance	subjective	aggregated (factored)	SMJ

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Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Fang, Wade, Delios, & Beamish, 2007	international diversification, organizational knowledge resources, and subsidiary performance	secondary	4,964 Japanese subsidiaries over a 14-year period	dependent	performance category (loss, breakeven, or gain)	objective	time (multiple periods)	SMJ
Fiss, 2006	social influence, CEO human capital, and managerial compensation	secondary	108 largest public German corporations as measured by market capitalization and sales in 1990	control	return on equity	objective	time series	SMJ
Fuentelsaz & Gomez, 2006	multimarket contact and strategic similarity in the analysis of entry decisions	secondary	189 entries by Spanish savings banks between 1986 and 1999	control	net profit divided by assets (return on assets)	objective	time series	SMJ
Goerzen & Beamish, 2005	alliance network diversity and MNE performance	survey and secondary	580 large Japanese MNEs	dependent	return on assets, return on sales, return on capital (all using operating profits)	objective	aggregated (factored)	SMJ
Goerzen, 2007	repeated alliance partnerships and firm performance	survey and secondary	580 large Japanese MNEs	dependent	operating return on sales, return on assets, operating return on capital	objective	aggregated (factored)	SMJ

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**Appendix (continued)**

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Gong, Shenkar, Luo, & Nyaw, 2007	number of joint venture partners, contract completeness, partner cooperation, and joint venture performance	survey	224 international equity joint ventures in the manufacturing industry in China	dependent	satisfaction with reputation, profitability, sales, market share, cost leadership, management of venture, technology development, product design, quality management, labor productivity, marketing, distribution, customer service, parent involvement (last 12 effectiveness)	subjective	multiple (measures), aggregated (factored)	SMJ
Goranova, Alessandri, Brandes, & Dharwadkar, 2007	managerial ownership and diversification	secondary	unbalanced panel of 961 firm-year observations of 231 firms in 41 two-digit SIC industries	control	return on assets	objective	time (multiple periods)	SMJ
Hayward & Shimizu, 2006	divestiture of poorly performing acquisitions	secondary	68 divestitures of formerly acquired firms	independent	industry-adjusted return on assets	objective	time series	SMJ

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Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Henderson, Miller, & Hambrick, 2006	industry dynamism, CEO tenure, and performance	secondary	228 CEO tenures in the computer industry for 1,397 CEO years; the food industry sample included 98 CEO tenures over 847 CEO years	dependent	return on sales, return on assets, return on invested capital	objective	time series, aggregated (factored)	SMJ
Homburg & Bucerius, 2006	speed of integration, relatedness, and post-merger and acquisition (M&A) performance	survey	232 firms that undertook M&A in central Europe between 1996 and 1999	dependent	return on sales after the merger or acquisition compared to before	subjective	single	SMJ
Hough, 2006	multilevel analysis of business segment, industry, and corporate effects on performance	secondary	19,405 segment-year observations nested within 5,092 business segments during 1995 to 1999	dependent	return on assets	objective	time series	SMJ
Hult, Ketchen, & Slater, 2005	cultural and information effects of market orientation on performance	survey and secondary	217 firms from a database of 1,136 U.S. firms	dependent, control	return on assets, return on investment, and return on equity	objective	multiple (measures)	SMJ

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Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Johnson, Ellstrand, Dalton, & Dalton, 2005	effect that the publication of ratings of boards of directors by the business press has on stockholder wealth	survey and secondary	firms with 50 of the "best" and 49 of the "worst" boards included in <i>Business Week</i> reports	dependent	abnormal stock return for 3 days after release of press ratings	objective	time (multiple periods)	SMJ
Kale & Singh, 2007	alliance learning processes, alliance capabilities, and alliance success	survey	175 firms in the computer, telecommunications, pharmaceutical, chemical, and electronics industries whose sales for 1998 were greater than \$100 million	dependent	perception of strong and harmonious relationship, achievement of objectives, greatly enhanced competitive position, learning critical skills, overall assessment	subjective	multiple (measures), aggregated (averaged)	SMJ
Karaevli, 2007	pre- and post-succession contexts and the performance effect of new CEO appointments	secondary	succession observations in 91 listed firms from the airline industry and 41 in chemicals between the years 1972 and 2002	dependent, independent, control	change in return on assets, return on sales, and total shareholder return	objective	multiple (measures), aggregated (averaged)	SMJ

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**Appendix (continued)**

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Karim, 2006	reconfiguration of internally generated and acquired units	secondary	866 units of 250 U.S. and non-U.S. firms operating in the U.S. medical industry from 1978	dependent, control	survival, profit margins	objective	time (multiple periods)	SMJ
Katsikeas, Samiee, & Theodosiou, 2006	strategic fit and performance implications of international marketing strategy standardization	survey	survey of 171 manufacturing subsidiaries of U.S., Japanese, and German MNEs operating in the U.K.	dependent	relative profitability as a percentage of sales, return on investment, profit growth, sales, sales growth, and new product sales, customer satisfaction, and customer retention (last five effectiveness)	subjective	aggregated (factored)	SMJ
Knott & Posen, 2005	benefits of firm failure through effects on market structure, firm behavior, and efficiency	secondary	170,859 firm-year observations of U.S. commercial banks from 1984 to 1997	dependent	survival (probability of exit)	objective	time series	SMJ
Kor & Leblebici, 2005	development and assignment of human capital, diversification, and firm financial performance	secondary	105 large U.S. private partnership law firms across a total of 271 observations	dependent	profit per partner (return on equity)	objective	time series	SMJ

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Tobin's $q$	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Kor & Mahoney, 2005	effects of the dynamics, management, and governance of R&D and marketing on firm performance	secondary	60 technology-based entrepreneurial firms that completed an initial public offering in the medical, surgical, and dental instruments industry between 1990 and 1995	dependent			objective	time series	<i>SMJ</i>
Kor, 2006	top management team and board composition and R&D investment strategy	secondary	77 technology-based entrepreneurial firms that completed an IPO in the medical and surgical instruments industry in the U.S. during 1990 to 1995	control		return on assets	objective	time series	<i>SMJ</i>
Kumar, 2005	role of target market features and reasoning in influencing value created from acquiring and divesting joint ventures	secondary	46 acquisitions and 39 divestitures belonging to 78 different joint ventures with at least one U.S. partner	dependent		abnormal stock return for 1 day before and 1 day after announcement	objective	single	<i>SMJ</i>

(continued)

## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Laamanen, 2007	acquisition premia and difficult to value resources	secondary	458 technology-based firm acquisitions completed between January 1, 1989, and December 31, 1999	dependent, independent, control	abnormal stock return for 1 day before and 1 day after announcement, market-to-book ratio, return on equity	objective	multiple (measures)	SMJ
Larraza-Kintana, Wiseman, Gomez-Mejia, & Welbourne, 2007	influence of compensation contract risk exposure on perceived risk taking	survey and secondary	108 CEOs of firms issuing an initial public offering of stock from 1993 to 1995	control	return on assets	objective	single	SMJ
Lavie, 2007	relative bargaining power and appropriation in alliance portfolios and their effect on performance	secondary	367 listed U.S.-based software firms with five years of records and their 20,779 alliances	dependent, independent	change in the market-adjusted market value of the firm, return on asset difference between partners	objective	time series	SMJ
Leask & Parker, 2007	strategic and competitive groups in the U.K. pharmaceutical industry	secondary	33 companies with the largest sales in the U.K. pharmaceutical industry between 1998 and 2002	dependent	change in ranked market share, market share, weighted market share	objective	multiple (measures), time (multiple periods)	SMJ

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### Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Lee & James, 2007	shareholder reactions to the appointment of female CEOs	secondary	1,624 executive announcements, including 529 CEO appointments in listed U.S. firms	dependent, control	abnormal stock return for 1 day before and 1 day after announcement, net income divided by sales, operating income before depreciation divided by sales, operating income after depreciation divided by sales, total shareholder return	objective	multiple (measures)	SMJ
Li & Zhang, 2007	political networking, functional experience, and new venture performance	survey	184 new technology ventures in China	dependent	relative return on investment, return on sales, profit growth, return on assets, overall efficiency of operations, sales growth, market share growth, and cash flow from operations	subjective	multiple (measures), aggregated (averaged)	SMJ

(continued)



## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Love & Nohria, 2005	performance effect of downsizing in relation to organizational slack	secondary	1,367 firm years of the 100 largest industrial firms in the U.S. from 1977 to 1993	dependent	industry-adjusted return on market-valued assets and return on book-valued assets	objective	multiple (measures), time series	SMJ
Luo, 2007	how joint venture partners' opportunism is influenced by environmental volatility	survey and secondary	188 surveys of foreign equity joint ventures in China	dependent	CEOs' overall satisfaction, return on investment between 2000 and 2002, sales growth over this period	subjective and quasi-objective	multiple (measures)	SMJ
Makino, Chan, Isobe, & Beamish, 2007	intended and unintended termination of international joint ventures	survey	999 international joint ventures and 2,222 wholly owned subsidiaries of Japanese firms from 1996 to 2001	dependent	survival (intended and unintended termination)	objective	time series	SMJ
Makri, Lane, & Gomez-Mejia, 2006	outcome and behavior-based performance criteria for rewarding CEOs in technology-intensive firms	secondary	206 firms from 12 U.S. manufacturing industries	dependent, control	market-to-book ratio, return on equity	objective	time series	SMJ

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Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Mani, Antia, & Rindfleisch, 2007	entry mode and equity level in foreign direct investment ownership structure	secondary	4,459 subsidiaries of 858 Japanese firms established across 38 countries, from 1992 to 2000	control	return on assets	objective	single	SMJ
McNamara, Aime, & Vaaler, 2005	methodology to estimate firm and industry effects on firm performance	secondary	19,926 annual business unit observations from 2,686 U.S. businesses operating in 84 industries (defined at the three-digit SIC level) from 1987 to 1996	dependent	return on assets	objective	time series	SMJ
Miller, 2006	technological diversity, related diversification, and performance	secondary	747 screened firms (192 diversified) with at least \$50 million in assets and information to compute Tobin's $q$	dependent, control	log of market value with log of replacement costs included in regression (Tobin's $q$ ), return on sales	objective	time (multiple periods)	SMJ
Misangyi, Elms, Greckhamers, & Lepine, 2006	multilevel approach to the importance of industry, corporate, and business segment effects on firm performance	secondary	10,633 observations for the years 1984 to 1999, in 2,055 business segments, 1,512 corporations, and 76 industries	dependent	return on assets	objective	multiple (measures), time (multiple periods)	SMJ

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**Appendix (continued)**

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Moliterno & Wiersema, 2007	resource divestment capability and firm performance	secondary	26 team franchises that participated in Major League Baseball during the period 1969 to 1983	independent	relative performance (based on win ratio)	subjective	time series	SMJ
Morrow, Jr., Sirmon, Hitt, & Holcomb, 2007	firm strategies and organizational recovery	secondary	178 single-product manufacturing firms from 1982 to 1994	dependent, control	Jensen's alpha, return on sales	objective	multiple (measures), time (multiple periods)	SMJ
Nadkarni & Narayanan, 2007	relationship between strategic schemas, strategic flexibility, and firm performance in fast- and slow-changing industries	secondary	225 firms: 124 firms in the slow-changing and 101 firms in the fast-changing industries	dependent	sales growth, return on investment, and net income growth	objective	multiple (measures), time (multiple periods), aggregated (averaged)	SMJ
Park & Mezas, 2005	market response to interfirm alliances in high and low munificence markets	secondary	408 alliances of 75 e-commerce firms listed on NASDAQ and NYSE from 1995 to 2001	dependent	abnormal stock return for 1 day before and 1 day after announcement	objective	single	SMJ

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Pehrsson, 2006	perceptions of relatedness and performance	survey	124 Swedish manufacturing firms with more than 100 employees	dependent	return on assets	objective	single	SMJ
Richard, Murthi, & Ismail, 2007	effect that racial diversity in human resources has on financial performance	survey and secondary	857 U.S. firms that participated in <i>Fortune</i> magazine's diversity survey from 1997 through 2002	dependent	Tobin's $q$ , revenue divided by number of employees (effectiveness)	objective	time series	SMJ
Rothaermel, Hitt, & Jobe, 2006	influence of integration and outsourcing on product offerings and performance	secondary	3,500 product introductions by 123 microcomputer manufacturers	dependent	log of revenue	objective	time series	SMJ
Sarkar, Echambadi, Agarwal, & Sen, 2006	innovative environment and survival patterns	secondary	3,431 manufacturing firms in 33 industries over 80 years	dependent	survival (exit)	objective	time series	SMJ
Shervani, Frazier, & Challagalla, 2007	moderating influence of market power on transaction cost factors	survey	109 product-market surveys from 40 U.S. manufacturers of electronic and telecommunication products	independent	executive satisfaction with return on investment and profits	subjective	aggregated (factored)	SMJ

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Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Short, Ketchen, Palmer, & Hult, 2007	hierarchical linear model of firm, strategic group, and industry influences on short-term and long-term measures of performance	secondary	1,165 firms in 12 four-digit SIC industries including pharmaceutical preparations, computer communication, radio, television broadcasting, and communication equipment and semiconductor-related devices with data from a 7-year period	dependent	return on assets, Tobin's $q$ , Altman's $Z$	objective	multiple (measures), time (multiple periods)	SMJ
Simsek, 2007	indirect influence of CEO tenure on performance through top management team risk-taking propensity and entrepreneurialism	survey	495 member firms of the largest small to medium-sized business lobby groups in the U.S.	dependent	relative performance on eight dimensions (including growth in sales, growth in market share)	subjective	time (multiple periods), aggregated (factored)	SMJ

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Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Singh & Mitchell, 2005	relationships between inter-firm collaboration and business sales	secondary	935 businesses operating in the U.S. hospital software systems industry between 1961 and 1991	dependent	sales, sales growth	objective	multiple (measures), time (multiple periods)	SMJ
Slater, Olson, & Hult, 2006	strategy formation capabilities, Miles and Snow's (1978) stances and performance	survey	380 manufacturing and service businesses operating in 20 different two-digit SIC code industries	dependent	overall performance, performance relative to competitors	subjective	aggregated (factored)	SMJ
Song, Droge, Hanvanich, & Calantone, 2005	effects on performance of marketing capabilities, technological capabilities, and technological turbulence	survey	466 U.S. joint ventures formed between 1990 and 1997	dependent	profit margin relative to objective, sales relative to investment relative to objective	subjective	multiple (measures)	SMJ
Sorenson, McEvily, Ren, & Roy, 2006	organizational scope, routines, and firm performance	secondary	175 computing machine manufacturers across 1,276 products and 2,869 machine tool introductions by 564 firms from 1975 to 1995 in the U.S.	dependent	survival	objective	time series	SMJ

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Tan & Tan, 2005	co-evolution of organizational environment and firm strategic adaptations over time	survey	104 state-owned enterprises in the Chinese electronics industry	dependent	profitability	subjective	single	SMJ
Tanriverdi & Venkatraman, 2005	relatedness, knowledge resources, and performance	survey and secondary	303 multibusiness <i>Fortune</i> 1000 firms listed in the year 2000	dependent	return on assets, return on equity, Tobin's <i>q</i>	objective	multiple (measures)	SMJ
Thornhill & White, 2007	pure vs. hybrid strategies and performance	survey	2,351 Canadian firms collected in 1999 and 2000	dependent	operating margin	quasi-objective	single	SMJ
Tiwana & Keil, 2007	peripheral knowledge and control in technology outsourcing alliances	survey	59 IT managers (and 42 matched-pair respondents) in 59 U.S. firms that had formed outsourcing alliances with software services firms	dependent	relative adherence to budgets, meeting project goals, work excellence, adherence to schedules, work quality, meeting design objectives, team operations, overall effectiveness, and overall efficiency (last seven effectiveness)	subjective	aggregated (factored)	SMJ

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## Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)	Journal
Uhlenbruck, Hitt, & Semadeni, 2006	market value effect of acquisition of Internet firms	secondary	1,029 M&As completed by publicly traded acquirers between 1995 and 2001	dependent	abnormal stock return on day of announcement	objective	single	SMJ
Wang & Zajac, 2007	how firms' relative resources and capabilities affect the costs and benefits associated with alliances or acquisitions	secondary	584 of the largest dominant business U.S. firms of 1990 over the period 1986 to 2000	control	difference in return on assets	objective	time (multiple periods)	SMJ
Werner, Tosi, & Gomez-Mejia, 2005	how ownership structure affects compensation strategy	secondary	407 U.S. firms from 29 industries for which matched data and proxy statements were available	independent	change in return on assets	objective	single	SMJ
Westphal, Boivie, & Chng, 2006	resource dependency and the reconstitution of ties	survey and secondary	293 firms from the Forbes index of large and medium-sized U.S. industrial and service firms	control	return on equity, market-to-book value of equity	objective	multiple (measures)	SMJ

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### Appendix (continued)

Author(s) and Year	Topic	Method (survey, secondary)	Data and Sample (where from and how large)	Role in Equation (dependent, independent, or control/covariate)	Performance Measure(s)	Subjective/Objective	How Used (single, multiple, aggregated, or time series)
Wiggins & Ruefli, 2005	intensity of industrial competition over time and sustaining competitive advantage	secondary	6,772 firms across 40 industries and all COMPUSTAT business segment data	dependent, independent $q$	return on assets, Tobin's $q$	objective	multiple (measures), time series
Yanadori & Marler, 2006	hierarchical model of strategy and compensation policies	survey and secondary	237 firms in the high-technology industry	control	return on assets, price-earnings ratio	objective	multiple (measures), time (multiple periods)
Zaheer & Bell, 2005	network structures and structural holes, internal capabilities, and performance	survey and secondary	77 member fund companies of the Investment Funds Institute of Canada	dependent	market share	objective	single
Zhang, 2006	contingencies affecting how a COO/president affects strategic change and CEO dismissal	survey and secondary	207 CEOs in 187 relatively large publicly traded, nondiversified U.S. manufacturing firms	independent, control	return on assets relative to industry	objective	time (multiple periods)

## Notes

1. This frequency of performance measurement has continued to be strong with 24% of papers in the same three journals adopting performance as a dependent variable during 2005 to 2007 (see Table 1).
2. We place innovation as outside of firm performance. Although it is often an important antecedent of performance and is often described as “performance,” including in four papers in the appendix, here, innovation is treated as part of the wider concept of organizational effectiveness.
3. Although we do not discuss it, the existence of organized and well-structured databases is another driver as to the prevalence of the use of specific financial performance measures and the sorts of companies studied. For example, COMPUSTAT and CRSP have allowed for both the more consistent and faster publication of findings and more direct comparability. However, COMPUSTAT and similar databases invariably include a specific bias as to which measures are most relevant and which firms get studied most.
4. Stern Stewart recommends 160 adjustments to overcome such distortions (Ittner & Larcker, 1998).

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