

Insights on Performance Measures: An Investigation of Relations among Performance Measures, Delegation, Incentives, and Strategy

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Abstract

We conduct a field examination of 53 high-tech firms and investigate the contingency factors that explain the extent of managers' use of eight categories of performance measures in evaluating subordinate performance. We then further investigate the relation between the use of performance measures for evaluation and for the allocation of rewards. Recognizing that firms use "packages" of measures (and controls), we also provide evidence on how particular measures are grouped into systems with particular strategies and structural configurations. We find that *different* dimensions of strategy (measured as sources of competitive advantage), delegation of decision rights, and types of incentives are significant in explaining the use of performance measures across the *different* categories of measures. We find mixed evidence that measures are used to both evaluate performance and to allocate rewards. We use cluster analysis to develop profiles of groups of firms and find that our sample is best described by three clusters we label: Accounting Control, Diversified Control, and Entrepreneurial Control firms. We find that Diversified Control firms, characterized by a high use of diverse measures, multiple sources of competitive advantage, high use of bonus compensation, and moderate delegation of decision rights, outperform Accounting and Entrepreneurial Control firms. In addition to testing general hypotheses and constructing profiles of firms, we advance theory by developing research propositions based on extant literature and insights from our empirical tests.

Key words: Performance measures, Strategy, Organizational design, Entrepreneurial firms, Contingency theory, Non-financial measures, organizational design

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1. Introduction

The choice of performance measures is one of the most important aspects of organizational design. The management accounting literature documents that performance measures, organizational design, and strategy are related. Indeed, Ittner & Larcker (1998) observe that “the use and performance consequences of [various performance] measures appear to be affected by organizational strategies and the structural and environmental factors confronting the organization” and call for research that provides evidence on the factors affecting the adoption of *various* non-financial measures. Our study directly responds to this call. Specifically, we conduct a field examination of the contingency factors that explain the extent of managers’ use of eight categories of performance measures in evaluating subordinate performance. Recognizing that firms use “packages” of measures (and controls), we also provide evidence on how particular measures are grouped into systems with particular strategies and structural configurations. Finally, we investigate whether performance measures are used to both evaluate subordinate behavior and allocate rewards. Thus, the purpose of this paper is to contribute to the limited body of knowledge concerning the choice, use, and packaging of multiple performance measures.

We undertake our study in the business-to-consumer (“B2C”) Internet sector because prior research establishes the importance of various non-financial measures for evaluating these organizations (e.g., Demers & Lev, 2001), and thus this industry provides a fruitful setting in which to explore the use of multi-faceted performance measurement systems. By working in this high-tech setting, we also address the recommendations of Chenhall (2003) who calls for more studies outside of the large manufacturing organizations that have been the focus of much of the prior management accounting literature. We specifically focus on the sales/marketing departments since customer acquisition and revenue generation were critical success factors for consumer-oriented Internet firms during the period of our study. As Chenhall (2003) notes, departments within the same firm often have different management control

systems,¹ suggesting the need for research related to the architecture of individual functional areas.

Although focusing on a single function limits the potential generalizability of our findings, it increases the power of tests due to the commonalities associated with this department across firms (Davila, 2005).

Because we examine a strategically important function in the Internet sector during the period of our study, we consider the benefits of this increased power to outweigh the limitations of generalizability.

Our research methodology consists of field-based and telephone survey interviews with the vice-presidents (VPs) of sales and marketing departments of U.S. high-tech firms. Tufano (2001) states that one of the major advantages of more clinically oriented research is its “inherently closer examination of purposefully restricted samples” (p. 187). The survey approach, in particular, offers a balance between large sample analyses and single-firm studies, and enables the researcher to ask specific, qualitative questions about the underlying constructs of interest (Graham & Harvey, 2001). Our study benefits from these characteristics of field-based survey research and enables us to construct a unique database with which to address research questions related to the use of performance measures.

We examine whether different aspects of strategy and organizational design explain VPs’ use of performance measures in evaluating their subordinates’ performance, and in turn, the use of measures for determining rewards. We also develop profiles of firms based on how they cluster into groups according to their use of particular measures, strategies, and structural configurations. Our 23 measures of performance group into 4 categories: employee, product, customers, and financial. Within two categories, there are multiple factors. The customer category contains four factors: satisfaction, size, value, and profitability; and the financial category contains two factors: revenue and other. Drawing on Porter (2001), we operationalize strategy using sources of competitive advantage that are critical within the high-tech industry. Specifically, we use 24 indicators of firms’ sources of competitive advantage that load on nine factors across five categories. We label these categories: intellectual capital; customer; products;

¹ Chenhall (2003) calls this functional differentiation. For example, Mia and Chenhall (1994) demonstrate that marketing and production departments of the same firms use different information in their management control systems. Similarly, Hayes (1977) shows that different subunits of a firm respond differently to environmental variables.

operations, and financial. With the exception of intellectual capital, within each of these categories there are two factors: customers—customer lists and reputation; products—product development and product breadth; operations—website capabilities and searchability; and financial—financial capital and margin. We operationalize organizational design to include the constructs of delegation of decision rights and incentive compensation. We use 12 indicators of delegation and find that they load on three factors which we label products, sales, and human resource management. Finally, we have two measures of incentives, including the percent of compensation derived from bonuses and the percent of compensation derived from stock options.

Our study contributes to the literature in a number of ways. First, we provide a greater understanding of the factors associated with the use of performance measures across multiple performance measure categories, and we do so for a specific decision context. Ittner & Larcker (2001) suggest that survey studies often do not identify the particular decision context underlying the performance measures of interest. This leads to potential inconsistencies across respondents and noisy measures of the use of performance measures. Our survey methodology overcomes this potential pitfall by specifying the particular decision context in which the use of performance measures is being rated: *the evaluation of subordinate performance*. Moreover, we investigate whether performance measures used for evaluation are also used to allocate specific types of rewards. We develop general hypotheses and find that *different* dimensions of strategy and organizational design explain the use of *different* categories of performance measures. For example, beyond concluding that incentive compensation is associated with the use of performance measures, we can show that the use of stock options explains financial revenue, customer satisfaction, product, and employee measures while the use of bonus compensation explains the use of financial revenue and employee metrics. Thus, we specifically, and with some depth, respond to the call for research that provides evidence on the variables affecting the use of various performance measures (Ittner & Larcker, 1998).

Our second contribution is that we use a systems approach based on contingency theory to cluster firms according to their use of particular measures, strategies, and organizational design. Although

exploratory in nature, we find and describe three general types of firms. We label the firms as *Accounting Control*, *Entrepreneurial Control*, or *Diversified Control*, based on the design of their performance measurement system, along with the other control components. We find that the *Diversified Control* firms are characterized by a high use of diverse measures and have higher performance than either *Accounting Control* or *Entrepreneurial Control* firms. This analysis recognizes that performance measures are not used in isolation; often firms package multiple performance measures within strategic performance measurement systems (Kaplan & Norton, 1996). We provide some of the first empirical evidence on how firms package these measures. We also provide evidence on how multiple aspects of organizational design (delegation, incentives, and performance measures) as well as strategy and entrepreneurial variables co-exist.

Our third contribution is that we generate testable research propositions. Similar to Chenhall & Langfield-Smith (1998), given the range of variables studied and the lack of strong theory, this study is by nature exploratory. However, we do develop general hypotheses that identify relevant variables to study and guide the tests. We examine the relations among eight types of performance measures, nine types of competitive advantage, three types of delegation, and two types of incentives. We draw on existing literature and our empirical results to develop a set of testable research propositions regarding performance measurement and organizational design. Our research propositions help advance theory and will provide direction and guidance for future research.

The rest of this paper is organized as follows. In Section 2, we provide an overview of the performance measurement literature, describe some of the findings from our pilot interviews that provide context for our choice of variables, and draw on the extant empirical and theoretical literatures to develop several general hypotheses. Section 3 explains our sample selection, survey methodology, and defines our variables. Section 4 presents our empirical specifications and findings. We first discuss the investigation of the determinants of performance measures, then present the results of our cluster analysis, and conclude by presenting our research propositions. Finally, in Section 5 we discuss the limitations of our study along with suggestions for future extensions.

2. Background

2.1 The Literature on Performance Measure Drivers

In their review of the management accounting literature, Ittner & Larcker (2001) summarize the extant empirical findings related to performance measurement as being broadly consistent with the notion that the choice of performance measures is a function of the organization's competitive environment, strategy, and organizational design. They also note, however, that this empirical literature has generated mixed results. The authors suggest that these mixed results may be due in part to deficient model specification arising from the omission of important contingency variables. Indeed, in a more targeted review of this particular literature, Ittner & Larcker (1998) suggest that future research can make a significant contribution by providing evidence on the contingency variables affecting the adoption of various non-financial measures. Our study addresses this gap in the literature by examining the association between various strategic (i.e., competitive advantage) and multiple organizational design factors (i.e., decision rights and incentive compensation) posited to be important determinants of performance measure choice. In so doing, we seek to enhance our understanding of specific performance measure use.

2.2 Contextual Background – Integration of Data from Pilot Firms

Insights from the field are one of the primary advantages of our chosen field-based methodology. In this section, we describe some of the information gleaned from our pilot interviews that we incorporate into the development of our hypotheses and interpretation of our results.

We interviewed executives at five high-tech firms in the Internet sector prior to developing our survey. The results from these pilot interviews confirmed our expectations that competitive advantage, delegation of decision rights within the department, incentives, and performance measurement are of primary interest to firms at a relatively young stage of development in the industry. In response to our questions about whether the firms were cost leaders or differentiators, all firms answered that they were differentiators. Consistent with Porter (2001), they explained their niche in terms of their competitive advantage versus other firms. For example, they discussed “timing, product breadth, human capital,

domain expertise, patents, technology, cash, focus, service, product mix”, and similar sources of competitive advantage. This supported our expectations that capturing strategy at a broad firm level (i.e., a prospector versus defender standpoint) was not appropriate for this type of firm. Instead, the firms were all prospector-like firms that were building and exploiting different sources of competitive advantage. Although extant research often captures organizational design based on the extent to which the firm is organized into multiple divisions or business units, we were investigating activities of a functional department. Therefore, we expected to focus on delegation within the sales/marketing function. These small high-tech firms all categorize their firms as centralized since they do not have multiple divisions or separate business units. However, it was evident that decision rights were delegated *within* the department or function and played an important role in the empowerment of employees. The executives talked at length about how they get their employees “committed to vision,” “have weekly brown bag lunches,” and try to convince the employees that they “feel like they’re on a winning team.” Incentives were viewed as being important to the firms and important to retaining a key resource: the employee. The executives relied on three primary types of incentives: bonuses, options, and perquisites (such as food, foosball, and having fun). Based on extant literature we expected to find a strong focus on multiple types of performance measures. Our interviews confirmed this expectation. The firm executives spoke at length about the various and diverse performance measures that they use. One executive stated “Performance measures. There are so many. [We use] contribution per transaction, EBITDA, cash flow, web metrics, marketing value.....” Another executive stated that “We are incredibly quantitative. [We] look at the numbers behind everything”.

Overall, it is clear from the pilot interviews that performance measurement is important in these high-tech firms, and that competitive advantage, the delegation of decision rights, and employee incentives are important strategic and structural variables determining the firms’ use of various performance measures. In the sections that follow we use these insights gained from our field work together with extant theory and empirical results to develop our general hypotheses relating strategy and organizational design to the use of performance measures in our setting.

2.3 The Relation Between Strategy and Performance Measure Choice

In order to effectively manage their organization, executives need performance measures that capture and reflect their firms' strategies. The empirical literature in this area can be broadly summarized as reaching three conclusions. First, the literature documents an alignment between firms' management control systems and their strategies (e.g., Ittner, Larcker, & Rajan, 1997; Langfield-Smith, 1997). In other words, performance measures provide information that is focused and specific to the firm's strategy. Early studies focus on organizational-level strategy variables that capture strategic positioning (e.g., Porter, 1980), strategic typologies (e.g., Simons, 1987), and strategic mission (e.g., Govindarajan & Gupta, 1985). More recently, Perera, Harrison & Poole (1997) argue that financial measures are too aggregate and short-term in nature, and are not focused enough to capture elements of strategy that are critical to the firm's success. They investigate the performance measurement system in firms that compete using a customer-focused strategy and find that firms rely more on non-financial measures related to their strategy than on traditional financial measures (e.g., profitability and return-on-investment). Abernethy & Lillis (1995) similarly find, for firms following a flexible manufacturing strategy, a higher reliance on efficiency-based measures than traditional financial measures while Fullerton & McWatters (2002) find that firms following a just-in-time manufacturing strategy rely more on non-traditional performance measures. Other studies explore the relation between management control systems and operational strategies such as quality and reach the same conclusion (e.g., Ittner & Larcker, 1995, 1997). Combining these measures in some type of scorecard or strategic performance measurement system has also warranted consideration (e.g., Kaplan & Norton, 1996). The research regarding multiple measures linked to strategy is mixed. For example, Lillis (2002) presents some qualitative evidence suggesting that measuring multiple dimensions of performance may be problematic depending on the strategic dimensions being combined. Conversely, Hoque & James (2000) find that for a sample of 66 Australian firms, greater Balanced Scorecard use is associated with improved performance

The second conclusion to emerge from prior research, based on the contingency framework, is that particular strategies combined with particular structural configurations result in better performance. Chenhall (1997) finds that firms exploiting total quality management experience higher performance when they rely on manufacturing performance measures. Davila (2000) finds that higher use of customer information regarding products coupled with a customer-focused strategy is associated with higher performance. He also finds that higher use of cost information coupled with a low cost strategy is associated with higher performance. Chapman (1997) and Chenhall (2003) provide in-depth summaries of the contingency literature. In trying to predict the use of performance measures using contingency variables and describe profiles of firms that cluster together, we rely on the literature discussed above that shows that management control systems and strategies are aligned, especially in firms that are better-performing.

The third conclusion that the literature provides is that the role of performance measures may differ (i.e., be used either interactively or diagnostically) depending on how firms differentiate themselves (Simons, 2000). Abernethy & Brownell (1999) find that firms undergoing strategic change had higher performance when they use their budgeting system in an interactive manner, rather than diagnostically. Henri (2005) found that a diagnostic (interactive) use of performance measures was negatively (positively) related to focus on strategic priorities. This literature helps motivate our use of a specific context (i.e., performance evaluation of subordinates) for our study.

In the analyses that follow, we investigate the relation between the use of performance measures and competitive advantage. We focus on competitive advantage since Porter (2001) suggests that it is critical to success in the Internet sector and thus of primary relevance to our setting. Competitive advantage is what companies use to “generate sustainable revenues or savings in excess of their cost of deployment” (p. 61) and includes both operational effectiveness advantages (i.e., superior inputs, effective management structure) and strategic positioning (i.e., product features, better array of services) (Porter, 2001). Our factor analysis produces 9 factors of competitive advantage that group into five categories: (1) intellectual capital; (2) customers – customer lists and reputation; (3) products -- product

development and product breadth; (4) operations – website capabilities (e.g., ease of use) and searchability (e.g., internet linkages offset by easy to find name); and (5) financial – financial capital and margin.

The literature discussed above suggests that firms rely more on the use of performance measures specific to their underlying differentiation (e.g., customers, manufacturing flexibility, or product quality). Thus we expect that the use of performance measures in evaluating subordinate performance will depend on the source of competitive advantage being used by the firm. Specifically, we expect that *different* sources of competitive advantage will be significantly associated with the use of different performance measures. This discussion leads to the first general hypothesis:

H1: The extent of use of certain types of performance measures in evaluating subordinate performance is positively associated with the extent of particular sources of competitive advantage.

2.4 The Relation between Organizational Design and Performance Measure Choice

A fully specified model of organizational control structure includes design choices related to the use of performance measures, the delegation of decision rights, and the level of incentive compensation (Jensen & Meckling, 1976; Milgrom & Roberts, 1992). In this section, we posit that both the delegation of decision rights and the use of incentive compensation will be associated with the choice of performance measures used in evaluating subordinate performance.

2.4.1 Delegation of Decision Rights

We examine the association between the choice of performance measures used in evaluating subordinate performance and the delegation of decision rights from the sales and marketing vice presidents to their subordinates. In general, entities will design their performance measurement system based upon the availability of quality performance measures (Grossman & Hart, 1986). Given the previously discussed availability of many performance measures in the B2C Internet sector together with the nature of the sales and marketing function, we expect that as the delegation of decision rights increases firms will make greater use of performance measures and that they will rely more upon measures that are informative about the specific decision rights being granted.

Prior literature related to the delegation of decisions finds that division managers with profit responsibility are evaluated on the basis of divisional summary measures (Abernethy, Bouwens, & Van Lent, 2004). Abernethy & Vagnoni (2004) find that as more formal authority is delegated to managers, more use is made of budget information. They argue that linking budget use to evaluation can motivate employees and align behavior with organizational goals. Jensen (2001) similarly contends that a summary measure of divisional performance is effective because divisional managers clearly understand their objective and retain the power to take multiple actions that will influence the summary measure. It follows that the delegation of decision rights within a single function such as the sales and marketing department also requires the appropriate performance measurement and monitoring techniques in order to align employee behavior with departmental objectives (see also Milgrom & Roberts, 1992).

Hayes (1977) suggests that sales and marketing departments are boundary-spanning functions that must take into account other internal functions such as production and new product development, as well as externalities (e.g., customers, competitors). Accordingly, he proposes that both external and interdependency variables (e.g., new product development) will explain the performance of marketing departments, while summary accounting measures will provide little information. Foster & Gupta (1994) similarly find that sales and marketing personnel are often expected to play a major role in cross-functional initiatives such as new product development, yet these same personnel complain that they are often evaluated solely on performance measures typically thought of as marketing-related (e.g., sales volume) and not on their cross-functional initiatives. Foster & Gupta (1994) therefore conclude that performance measurement systems for sales and marketing departments must change to include measures that are outside of the traditional set of marketing measures. Sales and marketing departments are also generally characterized as operating in an environment of high uncertainty (Hayes, 1977; Mia & Chenhall, 1994). Certainly the B2C sector at the time of our study was facing a tremendous amount of risk (see, e.g., Bhattacharya, Demers, & Joos, 2005). Chenhall & Morris (1986) found that managers in uncertain environments who delegate more also rely more on forward looking, non-financial measures.

In summary, the sales and marketing departments investigated in this study are boundary-

spanning units facing high levels of uncertainty and exposure to externalities. Sales and marketing managers are responsible for revenues and departmental expenses. Additionally, sample firms have access to a variety of departmental-specific measures for performance evaluation, including many measures that may be specific to particular decision contexts. The prior theoretical and empirical literature suggests that as more decisions are delegated firms will rely more extensively on the available performance measures. In the analyses that follow, we investigate the association between the use of performance measures and three sets of decision rights: (1) sales strategy decisions, such as budgeting and setting of strategy, (2) product decisions, such as discontinuations and price setting, and (3) human resource decisions, such as hiring, terminating, and promoting employees. We expect that the delegation of different sets of decision rights will be associated with greater use of performance measures that are informative about those particular managerial decisions that are being delegated. This leads to the following general hypothesis:

H2: The extent of use of certain types of performance measures in evaluating subordinate performance is positively associated with the extent to which particular sets of decision rights are delegated.

2.4.2 Incentive Compensation

Incentive compensation is costly to firms because it imposes risk on employees that are assumed to be risk-averse (Milgrom & Roberts, 1992). In order to manage this costly proposition it is necessary for firms to rely on performance measures that provide information that is useful for monitoring and for aligning employee behavior with organizational goals. Smith (2002) demonstrates that employees' behavior is driven by the weights placed on the underlying measures and that employees will exert more effort in response to higher-weighted measures.

In addition to the weight of the measure, firms must decide on the type of measure to use in the evaluation system. Aggregate financial measures, such as profitability and return on investment, are less sensitive to the actions of employees and provide less information for performance evaluation (Moers, 2005). Gersbach (1998) refers to this type of measure as a "general" control and analytically demonstrates that employees expend low levels of effort across tasks when compensation is linked to general controls unless the tasks are perfectly equivalent. In contrast, "specific" measures, such as customer, employee,

and new product measures, provide detailed information about the various tasks that employees perform and are more sensitive to employee actions. These measures are more precise, which is more effective for incentive contracting purposes (Holmstrom, 1979; Feltham & Xie, 1994). Gersbach (1998) shows that in contrast to general measures, employees focus attention across multiple tasks when they are evaluated on specific measures.

In the B2C sector, “specific” measures (Gersbach, 1998) are readily available for many firms as alternative or supplementary measures of performance (e.g., Demers & Lev, 2001). However, during the period of our study, the B2C Internet sector had evolved towards an increased focus on “monetizing” web traffic, which is measured using “general” controls. That is, there was increased pressure from the providers of capital for Internet firms to attain meaningful financial rather than merely non-financial performance (see, e.g., Schrage, 2000; Ackman, 2001; Business Week, 2001; Shepard, 2001). Thus, we expect that firms that rely heavily on incentive compensation will make use of both “specific” and “general” performance measures in order to monitor and control the use of incentive compensation.

In the high-tech setting of our study, incentive compensation typically consists of a mix of annual cash bonuses and stock options. Therefore, in the analyses that follow, we investigate the association between the use of performance measures in evaluating subordinate performance and two types of incentive compensation: the percentage of compensation received in each of bonuses and stock options, respectively. The literature discussed above suggests that the use of performance measures is positively associated with the level of incentive compensation. Compensation literature also suggests that the use of bonus and option compensation motivates different behaviors and a focus on different time horizons (Milkovich & Newman, 2002). Thus, we expect that *different* types of incentive compensation will be significantly associated with the use of *different* categories of performance measures. The above discussion leads to the following general hypothesis:

H3: The extent of use of certain types of performance measures in evaluating subordinate performance is positively associated with the level of particular types of incentive compensation used by the firm.

2.5 Two Uses of Performance Measures

Performance measures are used to both facilitate decision-making and influence behaviors (Demski & Feltham, 1976). In the prior sections, we hypothesize that organizational design and strategy influence the use of performance measures in subordinate performance evaluation. Many researchers suggest that these decision-facilitating measures also be used in allocating incentive compensation (Kaplan & Norton, 1996; Ittner, Larcker, & Randall, 2003), thus we expect that the performance measures used for evaluation will, in turn, be used to allocate rewards. This leads to the following general hypothesis:

H4: The extent of use of certain performance measures in evaluating subordinate performance is positively associated with the extent of use of those performance measures in allocating rewards.

Figure 1 illustrates the relations developed above in hypotheses 1- 4.

[Insert Figure 1]

2.6 Control Variables

Our sample consists of high-tech firms in the Internet industry and accordingly we include variables that the prior literature has found to be important to the determination of management control systems in entrepreneurial settings (e.g., Davila, 2005). Specifically, we control for firm age, the founder acting as CEO, the extent of venture capitalist (“VC”) ownership in the firm, and size.

It is likely that older firms will have more formalized performance measure systems (Davila, 2005). Firms learn as they mature and thus are able to implement stronger control systems. Moores & Yuen (2001) conclude that a formal management accounting system varies across life-cycle stages. They argue that management control systems are lacking in young firms and then increase in importance as firms grow (see also Simons, 1995, 2000). As firms grow they require more information and engage in more sophisticated decision-making processes that necessitate a need for a more sophisticated and formal management control system (Davila & Foster, 2005).

Organizations become more formal and structured when the founder, who is more entrepreneurial by nature, is replaced by a professional CEO (Greiner, 1998). Davila (2005) argues that entrepreneurs are not concerned with controls since they assume that others in the firm share in their vision. Accordingly,

they are not control oriented since they may not see the need to motivate and align employee behaviors. Hence, the use of performance measures throughout the organization may not be emphasized. Venture capitalists could act as an alternative form of monitoring, and thereby reduce the need for a strong performance measurement system. On the other hand, the presence of venture capitalists may cause performance measures to be emphasized. Davila (2005) argues that results controls (i.e., performance measures) are increasing in the presence of venture capital due to the informational needs of venture capitalists. Davila (2005) provides empirical support that venture capital and a “new” CEO are associated with increased emphasis on results controls.

Finally, it is likely that size influences the use of performance measures. Managers in large firms are inundated with information and the use of a formal performance measurement system can facilitate the manager’s ability to more effectively use the information (Chenhall, 2003).

3. Sample Selection and Survey Methodology

3.1 Sample

We undertake our study in the high-tech business-to-consumer (“B2C”) Internet sector for three primary reasons. First, we are responding to the need for studies of management accounting systems of firms in settings other than large manufacturing, large sample situations (see, e.g., Ittner & Larcker, 2001; Chenhall, 2003). A second reason to study firms involved in Internet commerce is that this sector itself is economically significant in terms of market capitalization and wealth creation within the broader economy. The final reason to undertake our study of the multi-dimensionality of performance measures in this setting is the evidence that non-financial and financial measures of performance play a role in the evaluation of B2C Internet firms (e.g., Rajgopal, Kotha, & Venkatachalam, 2000; Trueman, Wong, & Zhang, 2000) even after the stock market correction in 2000 (Demers & Lev, 2001). Thus, overall the B2C sector provides a representative, economically significant, setting in which to generally broaden the scope of management accounting research and in particular to examine questions related to the multi-dimensionality of performance measures.

Our focus on a single department within B2C firms is a natural extension of the earlier

management accounting literature that treats the firm itself as the unit of observation. Our study relaxes the implicit assumption in prior research that management control systems are consistent throughout the organization. We select the sales/marketing function because the customer list and brand building responsibilities of this department are critical to the success of consumer-oriented Internet companies, while revenue generation became overwhelmingly important in the Internet sector during the period of our study. Thus, the sales/marketing department, which is common to all B2C firms, was a strategically important function of Internet firms during the period of our study.²

Consistent with prior studies in this sector (e.g., Demers & Lev, 2001; Hand, 2001) we define Internet companies as firms that earn the majority of their revenues as a result of the existence of the Internet.³ We identify a sampling frame of publicly traded Internet companies from the InternetStockList™ in April 2001 (provided by internet.com at <http://www.internetnews.com/stocks/list/>), a frequently cited and authoritative list of currently trading Internet companies. We define the companies as B2C Internet firms if they fall into any of the following Internet subsectors: e-tail, content/communities, financial news/services, portal, services, and advertising.⁴ We then extend our sampling frame to include a number of large, non-publicly-traded B2C Internet firms identified from the highest traffic sites in the Nielsen//Netratings database for April 2001. This results in a sampling frame of 99 candidate B2C firms for potential inclusion in the study.

Our final surveyed sample consists of 53 B2C Internet companies out of a potential pool of 87 firms that were determined to have ongoing operations at the time of our field visits.⁵ The remaining 34 companies either declined to participate or did not respond to our numerous telephone and email attempts

² The other primary functional area that emerged from our pilot interviews with B2C Internet executives was the operations department. Given the nature of the B2C service/merchandising sector, however, this department tended to be more technical in nature and served as the infrastructural backbone rather than being involved in strategic business decisions.

³ This definition was originally established by internet.com, an authoritative portal site on Internet firms, in order to distinguish between “pure play” Internet companies and entities that would exist without the Internet generating a majority of their revenues.

⁴ The subsectors were identified from the classification scheme provided by Wall Street Research Net © WSRN.com (http://www1.wsrn.com/icom_index/index.xpl), where available, or from a review of the business description provided on the company’s own website.

⁵ By the time of our survey, seven companies had ceased operations and five were under reorganization.

to arrange an interview. A full summary of how we arrived at the final sample is presented in Table 1. Our response rate of approximately 61% (53/87) compares favorably to other recent surveys involving senior executives of large firms, such as Graham and Harvey (2001)'s response rate of 9% of the CFOs surveyed and Keating (1997)'s response rate of 45% of division managers surveyed.⁶

[Insert Table 1]

Notwithstanding our favorable response rate, we test for possible self-selection bias by comparing the characteristics of firms included in our sample to those of targeted firms that did not participate in the survey. On average, our sample firms are somewhat smaller than the group of non-participants, with median sales of approximately \$40 million and total assets of \$114 million versus \$135 million ($p = 0.005$) and \$459 million ($p = 0.003$), respectively, for non-participating B2C firms. However, the two groups do not differ on the basis of profitability, stock price performance, or web traffic. The median ROA for sample firms is -41% versus -34% for non-sample firms ($p = 0.55$), the median stock return for calendar 2000 is -89% for sample firms versus -88% for non-participants ($p = 0.89$), and the median page views for the sample is 49 million versus 63 million for non-participants ($p = 0.90$).⁷ Thus, although our sample firms are somewhat smaller, they do not differ with respect to financial or web traffic performance.

As shown in Table 2, Panel A, participating firms cover all segments of the B2C sector, with the primary two segments represented in our sample being content/community and e-services. Further descriptive statistics for our participating firms are presented in Table 2, Panel B, and reflect that, although our sample consists of many of the major players in the Internet sector, the sample firms are relatively small, with mean (median) sales of approximately \$161 (\$40) million and mean (median) total assets of \$386 (\$114) million. The sample firms employ 688 full-time equivalent persons, on average, with the median firm employing 180 people. Consistent with general performance results for B2C

⁶ For further comparison, earlier studies' response rates are as follows: Shields & Young (1993) (20%), Shields & Young (1994) (56%), and Foster & Gupta (1994) (23%).

⁷ The financial statement data for non-respondents is obtained from Compustat, where available, or by hand-collection from annual reports as necessary. Non-financial web traffic metrics are obtained from the Nielsen//Netratings Audience Measurement database, and stock market data are derived from the CRSP database.

Internet firms during our sample period, these firms report negative mean and median net income figures of -\$222 million and -\$40 million, respectively. The sample firms generate considerable web traffic, with a mean (median) of 530 (49) million page views and 6.4 (3.3) million unique visitors to their websites each month. Sample firms report that they generate approximately 51% of sales, on average, from repeat customers and the average (median) number of employees in the sales/marketing department is 68 (25).

[Insert Table 2]

3.2 Survey Design and Implementation

Our survey employs a questionnaire that elicits information about a number of characteristics of the firms' sales/marketing departments, including: the design of performance measure systems, evaluation and rewards for the average employee within the department, firm strategy and environmental factors, the delegation of decision rights, firm ownership, and size measures. The final survey evolved through a series of interviews as discussed below.

Based upon a review of the existing academic literature and extensive research into the Internet sector, we developed an open-ended interview questionnaire to be used as a basis for discussion with B2C Internet experts and executives. We first met with a leading venture capitalist in Silicon Valley who has been actively involved in corporate investment and governance of Internet firms since the inception of the commercialization of the Internet in the mid-1990s. We then used the questionnaire to interview senior executives at five Internet firms in Silicon Valley that operated in different B2C Internet subsectors. Each of the meetings lasted approximately 60 to 90 minutes, involved discussions with the Internet companies' CEOs and several other high-ranking executives, and provided us with insights into general B2C firm characteristics, as well as variables related to key constructs underlying our study, including: the responsibilities associated with different functional areas within the firm, aspects of corporate performance measurement systems, the delegation of decision rights both across functional areas and down the hierarchy within functional areas, and competitive and market conditions affecting the firm's environment. Relying on the detailed responses that we received in these field visits, we constructed a

draft of the questionnaire that would ultimately form the basis of our survey instrument.⁸

We pretested the survey instrument with 5 academic colleagues, each of whom had expertise in the Internet sector, marketing and corporate strategy, and/or research survey design. We also pretested the survey separately on each of the co-authors. In every pretest, the time required to complete the survey was noted and any ambiguities in the survey questions were identified. Based upon the feedback obtained through several such iterations, we shortened the survey and reworded various questions.

In order to enlist the vice presidents of the sales/marketing department from the Internet firms to participate in our study, we contacted firm representatives by telephone and/or by email. We identified the VP Sales/Marketing executive to be targeted at each firm by reviewing the company's corporate website and/or via requests for the relevant corporate officer from the firm's receptionist. Upon request, we provided the targeted interviewee with information related to the nature of our survey, our respective university affiliations, the estimated time required to complete the survey, a guarantee of confidentiality over the information disclosed and full anonymity in the reported results, a commitment to provide participants with a copy of our completed report, and details of the sponsorship of our study by the Chartered Institute of Management Accountants ("CIMA"). We did not in any case disclose the questionnaire prior to its ultimate implementation to consenting firms' sales/marketing executives.

The survey was implemented using two different mechanisms. On-site interviews were conducted for the 35 (66%) sample firms that were concentrated within particular geographic areas (e.g., New York City, Silicon Valley, Southern California, and Chicago) or that were otherwise accessible by one of the authors. Telephone interviews were conducted for the remaining 18 (34%) firms that were individually isolated in other parts of the U.S. and/or that could not otherwise be scheduled for in-person visits. At the outset of both telephone and in-person interviews the participant was provided with a handout that depicted the scales used for many of the questions in the survey. We provided this handout in order to maximize the consistency with which interviewees understood the scale to be applied to each question,

⁸ The firms that we interviewed during this pilot study phase are characteristically similar to our sample firms, however the pilot firms are not included in the sample that we use to conduct our empirical tests.

and to thereby minimize noise in the survey's responses. Consistent with the time allotment that we requested from participating executives when we scheduled our appointments, the surveys took approximately one hour, on average, to implement. The surveys were conducted from the end of June 2001 through January 2002, with the majority of the interviews taking place during the summer of 2001.

Each interview involved the implementation of the structured questionnaire. The questionnaire was not provided directly to participants, but rather was read aloud to the interviewees by one of the co-authors of this study. We attempted to anticipate those questions that were most likely to require clarification and/or supplementary definitions, and included standardized clarifications for verbal delivery to interviewees on the survey instrument. In order to ensure consistency, all three authors adhered strictly to the structured questionnaire for delivery of questions and clarifying comments. Ad hoc, or otherwise unstructured follow-up questions to the interviewees' responses, were not admitted into the process until after the conclusion of the formal administration of the questionnaire.

Our survey design and implementation were structured to mitigate several of the most common criticisms of survey-based research, including: concerns over the identity of the respondent, the possibility that respondents had experienced unresolved interpretation difficulties while completing the survey, lack of investigation of non-response bias, use of outdated survey instruments, and lack of necessary institutional knowledge.⁹ First, because we spoke directly to the respondents, we have assurance that the relevant executive within each firm completed the survey. Second, because the authors read the survey to the respondents and had standardized a set of clarifying comments for any potentially ambiguous questions, we were able to address any confusion arising from the interpretation of our survey questions. Third, since we attempted to contact all firms by telephone, we have a precise list of firms that chose not to participate in the study, thus facilitating an assessment of non-response bias. Fourth, since we developed our own instrument for this study, we were able to tailor the survey to firms competing in the B2C Internet sector. Finally, we were able to gain institutional knowledge prior to the development of the

⁹ See Young (1996) for a discussion of survey research.

final survey instrument through our preliminary field visits.

3.3 Measurement of Variables

We use 7-point, Likert-scale questions to construct variables for performance measures, delegation, and strategy. Seven indicates high use of performance measures in evaluating subordinates,¹⁰ full delegation of decision rights, and high source of competitive advantage.¹¹ Note that we reverse coded questions about delegation and competitive advantage. All measures use the full range of responses. Descriptive statistics are shown in Table 3. Appendix A contains an abbreviated list of survey questions.

[Insert Table 3]

We ask about multiple types of performance measures, delegation, and strategy. We use principal components analysis with an oblique rotation of the factor solution to reduce the dimensionality of survey responses. We use an oblique rotation since it is well-accepted that firms use multiple measures, delegate multiple types of decisions, and have multiple sources of competitive advantage, thus it is likely that the factors are correlated. We use the scores of our factor solutions to create variables for performance measures, delegation, and strategy, thus they have a mean of 0 and a standard deviation of 1. We use factor loadings > 0.50 to help label the construct. The factor solutions are shown in Table 4. In the following sections, we describe each variable in more depth.

[Insert Table 4]

3.3.1 Performance Measures

We are interested in exploring those measures that VPs actually use; therefore, we identify 23 measures that have a median value greater than 2.0 for use in the subsequent factor analysis. The factor solution in Table 4, Panel A, shows that there are eight factors across four broad categories: employees,

¹⁰ The study cannot disentangle the underlying reason for a measure that is evaluated as “1” since managers could either not use the measure or the measure could be unavailable. However, based on underlying literature and preliminary field work, these measures are all fairly common measures available at most firms, thus the lack of availability of these measures is not considered problematic.

¹¹ We use this scale because we desire variation in the extent each item is a source of competitive advantage. Items that are either worse than the firm’s competitors or equal to the firm’s competitors are not a source of competitive advantage. We are interested in the extent of the variation past this point.

products, customers, and financial. Measures such as employee turnover and the number of new hires load on a factor that we label employees (*PM_EMP*). Measures including revenue and profitability of new products, along with the number of new products, load on a factor that we label products (*PM_PROD*). The factor analysis reveals four customer-related factors. Measures of internal and external customer satisfaction load on a factor that we label satisfaction (*PM_CUST SAT*). The number of customer complaints and market share load on a factor that we label size (*PM_CUST SIZE*). Measures of lifetime value and the cost to acquire a new customer load on a factor that we label value (*PM_CUST VAL*). Finally, measures of customer profitability and the number of new customers load on a factor we label profitability (*PM_CUST PROF*). There are two financial factors; measures of revenue load on a factor that we label revenue (*PM_FINL REV*) while measures of budget variances and gross margin load on a factor that we label other (*PM_FINL OTH*). We highlight all indicators that we use to help interpret the factors, all of which except one, load in excess of 0.50.¹² We find that one measure, net income, crossloads on both *PM_FINL OTH* and *PM_CUST SIZE*, which we find acceptable due to our desire to use all indicators. The Cronbach's alpha indicates high internal consistency with ratings ranging from 0.530 to 0.857. As an alternative measure of internal consistency, we also compute the variance extracted for each factor and note that in all cases it is higher than 0.50% (Hair, Anderson, Tatham, & Black, 1998). We conclude that the factor solution is acceptable for use in further analysis.

We next construct variables that capture the extent of use of performance measures to allocate incentives. We asked the respondents to provide us with the top five measures that they use for performance evaluation. We then ask about the use of each of the measures to allocate bonuses and stock options. The answer to this is measured using a 7-point Likert-scale, where 7 indicates that the respondent relies strongly on that measure. For each firm, we manually code the measures as a "1" if they were one of the 23 measures identified above, and we code the measure as a "0" if it is not one of those measures (e.g. timeliness). We multiply the coding by the respondents' Likert-scale response. If multiple measures

¹² The highest loading for Revenue is on *PM_FINL REV* with a loading of 0.470.

are in the same factor, we sum the weighted scores.¹³ We require that at least 10 respondents use the measure in order to perform regression analyses on the measure. Measures corresponding to the factors labeled *PM_FINL REV*, *PM_FINL OTH*, and *PM_CUST PROF* exceed our requirement and thus are used in subsequent analyses; we generate two new incentive-related variables for each factor, one for bonus and one for options. We label these new variables as *BON_FINL REV*, *BON_FINL OTH*, *BON_CUST PROF*, *OPT_FINL REV*, *OPT_FINL OTH*, and *OPT_CUST PROF*, respectively. Descriptive statistics for these measures are shown in Table 5. Budget variances are the most frequently cited top five measure, followed by revenue, growth in revenue, and number of new customers. Revenue per employee is weighted the highest for determination of bonuses, and budget variances are weighted the highest for option determination. The weights on determination of bonus compensation are significantly different from the weights on option compensation (*BON_FINL REV* mean of 5.36 vs. *OPT_FINL REV* mean of 3.34, $p = 0.0131$; *BONUS_FINL OTH* mean of 3.04 vs. *OPT_FINL OTH* mean of 2.55, $p = 0.1019$; and *BON_CUST PROF* mean of 1.89 vs. *OPT_CUST PROF* mean of 1.02, $p = 0.0623$).

[Insert Table 5]

3.3.2 Organizational Design Constructs

We use two proxies for organizational design: the delegation of decision rights and incentive compensation. Based on existing literature and our preliminary field investigation, we asked respondents about 12 types of decision rights spanning personnel, pricing, product, and sales strategy decisions. The factor solution in Table 4, Panel B, shows that the 12 questions load on three factors,¹⁴ which we label as decision rights over, respectively, human resources (*DR_HR*), products (*DR_PROD*), and sales (*DR_SALES*). Decisions including hiring and firing of employees load on *DR_HR*. Decisions such as setting prices and discontinuing product lines load on *DR_PROD*, while decisions such as setting of sales

¹³ For example, assume a respondent gave the top five measures as revenue/employee, growth in revenue, gross margin, customer profitability, and number of new customers and weighted the measures for use in allocating bonus compensation a 6, 5, 5, 7, 3, respectively. We compute the scores: *BON_FINL REV* as 11 (revenue/employee of 6 + growth in revenue of 5). We compute *BON_CUST PROF* as 10 (customer profitability of 7 + number of new customers of 3). *BON_FIN OTH* is 5.

¹⁴ We asked fourteen questions about the delegation of decision rights; however, a number of respondents (> 5) chose not to respond to two questions, thus we didn't use these two questions in our analyses.

strategy and the budget load on *DR_SALES*. Two questions (personnel policy and determining non-pecuniary rewards) load moderately on two factors; the highest of which is *DR_SALES*. The three factors cumulatively explain 66% of the total variance. The Cronbach's Alpha ranges from 0.667 to 0.891 and the variance extracted for each individual factor exceeds 50%, indicating a high degree of internal consistency. We conclude that the factor solution is acceptable for use in further analysis.

We measure incentive compensation using two questions that capture the percentage of subordinates' compensation that is derived from bonuses (*%BONUS*) and stock options (*%OPTION*), respectively. These measures are obtained directly from survey respondents and the descriptive statistics associated with these measures are presented in Table 4, Panel C. The firms in this sample provide, on average, 22.47% of compensation in the form of annual bonuses and 7.84 % in the form of stock options.¹⁵

3.3.3 Strategy Constructs

We measure strategy as the firm's source of competitive advantage and ask about 24 different sources. The results of the factor analysis in Table 3, Panel C, show that the factor solution extracts nine factors across five categories which we label as follows: (1) intellectual capital (*CA_INTCAP*); (2) customers – customer lists (*CA_CUSLST*) and reputation (*CA_CUSREP*); (3) products -- product development (*CA_PRODEV*) and product breadth (*CA_PROBRD*); (4) operations – website capabilities (*CA_OPSWEB*) and searchability (*CA_OPSSRCH*); and (5) financial – financial capital (*CA_FINCAP* and margin (*CA_FINMRGN*). *CA_INTCAP* includes sources such as service and product knowledge, *CA_CUSREP* includes brand name and reputation, *CA_PRODEV* includes sources such as timing (e.g., first to market) and proprietary technology, *CA_OPSWEB* includes sources such as speed and ease of use of the firm's website, and *CA_FINCAP* includes low costs and financial capital. *CA_PROBRD* and *CA_CUSLST* are both one-item factors. *CA_OPSSRCH* and *CA_FINMRGN* include sources that load both positively and negatively. Linkages among firms on the internet load positively on *CA_OPSSRCH* while

¹⁵ This is consistent with the information that we received during our pilot interviews. Employees were concerned with the number of options they received, especially in conjunction with hiring; however, cash-in-hand was the component of compensation that was most important to employees during the period of our study.

easy to find name loads negatively. We interpret searchability as being driven either by linkages or by easy to find name depending on whether the relation with the factor is positive or negative. Low price loads positively on *CA_FINMRGN* and inventory management loads negatively. We interpret the latter factor as one based on volume. If volume, driven by low price, is sufficient, firms may not take the time to refine their inventory management system. The costs of such refinement may not exceed the benefits when inventory is purchased by price-conscious consumers. Two questions load moderately on more than one factor, but only at > 0.40 on one factor, thus we leave them in the analysis. The Cronbach alphas for all multi-item factors indicate high internal consistency with ratings of > 0.63 , with the exception of *CA_FINMRGN* and *CA_OPSSRCH*. As an alternative measure of internal consistency, we also run the variance extracted for each factor and note that in all cases it is higher than 0.50% (Hair et al., 1998). We conclude that the factor solution is acceptable for use in further analysis.

3.4 Control Variables

We control for entrepreneurial factors and size, both of which will likely influence the use of performance measures. The descriptive statistics are reported in Panel D, Table 3. We include an indicator variable which is set equal to one when the founder remains as the firm's CEO (*CEO_F*). We measure this variable using a survey question that asks the respondent to indicate whether the founder of the firm is currently the CEO. Fifteen of the 53 firms have a founder CEO (28.3%). We measure the extent of ownership by venture capitalists using a survey question that asks the respondent to identify what percentage of the firm's outstanding shares are owned by venture capitalist shareholders (*%VC_OWN*). Venture capitalists have an 8% ownership interest, on average, for the firms in this sample. We verify the survey responses for both *CEO_F* and *%VC_OWN* against information reported in each firm's proxy statements to ensure that the survey responses are accurate.¹⁶ We measure the firm's age (*AGE*) using a survey question that asks the respondent how long the firm has been in existence in years and months. On average, the firms in our sample have been incorporated for 7.91 years. Finally, we control for size using

¹⁶ We were able to obtain proxy statements for the public firms in our sample. For those firms we verified the survey response against the information contained in the proxy. For privately-held firms, we used their survey response.

the natural log of total assets reported on Compustat (*LN_SIZE*). We replace missing values (for the privately-held firms) with the mean of the sample in order to avoid losing observations. On average, our firms have \$386.2 million in total assets.

4. Empirical Tests

We perform two sets of empirical analyses. First, we use OLS regression analysis to test the model illustrated in Figure 1, which depicts hypotheses 1 through 4.¹⁷ Second, we use cluster analysis to profile groups of firms based on the fit of the particular strategy, incentives, delegation, and performance measures. In both analyses we control for the entrepreneurial variables.

4.1 Regression Analyses

The regression analyses proceed in two steps. First, we run eight separate regression analyses, each of which uses a different dependent variable capturing the use of different performance measures. Second, we run six separate regression analyses to estimate the relations between the use of performance measures in evaluating subordinate behavior and the use of those performance measures in allocating bonuses and stock options. To provide evidence on our general hypotheses and the model illustrated in Figure 1, we estimate the following functions:

Performance measures used to evaluate subordinate performance = $f\{\text{delegation, incentives, competitive advantage, and control variables}\}$

Performance measures used to allocate bonus compensation or options = $f\{\text{performance measures for evaluating subordinate performance}\}$

In the first function we have 18 possible independent variables thus we use stepwise regression with an entry threshold of 0.20 and an exit value of 0.30 to estimate the relations.

In untabulated results, we find, as expected, significant bi-variate correlations within the eight types of performance measures, the three types of delegation, the two incentive variables, and the nine types of competitive advantage. We also find many significant bi-variate correlations between performance measures and our predictor variables, as expected. None of the correlation coefficients

¹⁷ The implicit assumption underlying our regressions that use the various types of performance measures as dependent variables is that managers are making (at least directionally) *appropriate* choices.

exceed 0.55. The variance inflation factors suggest that we do not have a multicollinearity problem.¹⁸ The regression results are shown in Table 6.

[Insert Table 6]

After controlling for entrepreneurial variables, we find support for each of our general hypotheses. H1 predicts that the use of certain performance measures depends on the specific source of competitive advantage used by the firm. Our findings are consistent with this hypothesis. Specifically, *PM_FINL OTH* and *PM_PROD* are positively associated with *CA_PRODEV* ($p < 0.05$, $p < 0.01$, respectively) while *PM_FINL REV* is positively associated with *CA_PROBRD* ($p < 0.10$). Multiple types of competitive advantage explain the use of customer measures. *PM_CUST SAT* is positively associated with *CA_FINCAP* ($p < 0.05$) and *CA_INTCAP* ($p < 0.01$), *PM_CUST VAL* is positively associated with *CA_OPSEWEB* ($p < .10$), *PM_CUST SIZE* is positively associated with *CA_CUSREP* ($p < 0.05$), and *PM_CUST PROF* is positively associated with *CA_OPSEWEB* ($p < 0.01$). Finally, the results in Panel C show that there is a positive association between *PM_PROD* and *CA_PRODEV* ($p < 0.01$) and *CA_FINMRGN* ($p < 0.01$). Overall, the results show that seven different sources of competitive advantage are significantly and positively associated with the use of performance measures in evaluating subordinates.

H2 predicts that the delegation of certain decision rights explain the use of certain types of measures. The results show that *DR_HR* helps explain the use of *PM_FINOTH* ($p < 0.01$), *DR_PROD* helps explain the use of *PM_CUST SAT* ($p < 0.01$), *PM_CUST PROF* ($p < 0.05$), and *PM_PROD* ($p < 0.05$). Interestingly, *DR_SALES* is negatively associated with *PM_FINL OTH* ($p < 0.10$) while *DR_HR* is negatively associated with *PM_CUST SAT* ($p < 0.10$) however, these are both marginal effects. The preponderance of the evidence is consistent with delegation of different decision rights being positively associated with the use of different performance measures in evaluating subordinates.

H3 predicts that the levels of particular types of incentive compensation are associated with the

¹⁸ Kennedy (1992) suggests that VIF statistics in excess of 10 are indicative of severe multicollinearity.

use of certain types of performance measures. We see that *%BONUS* helps explain *PM_FINL REV* ($p < 0.05$) and *PM_EMP* ($p < 0.05$) while *%OPTION* helps explain the use of *PM_FINL REV* ($p < 0.10$), *PM_CUST SAT* ($p < 0.01$), *PM_PROD* ($p < 0.10$), and *PM_EMP* ($p < 0.05$). Interestingly, we find that firms rely less on the use of *PM_FINL OTH* ($p < 0.05$) and *PM_CUST VAL* ($p < 0.05$) when they rely on bonuses for incentive compensation. In summary, we conclude that the results provide evidence that support H1, H2, and H3.

Finally, recall that H4 predicts that the extent of use of measures to evaluate subordinate performance is positively associated with the extent of use of those measures to allocate rewards. The results in Table 6, Panel E, show that the use of *PM_FINL REV* is significantly associated with the use of *BON_FINL REV* ($p < 0.05$), *PM_CUST PROF* is significantly associated with the use of *BON_CUST PROF* ($p < 0.05$) and *OPT_CUST PROF* ($p < 0.05$); however, the remaining three relations are unsupported. Overall, we find mixed support for H4.

Our analysis assumes a partial equilibrium framework in that we take all aspects of the organizational design and control system other than the performance measure usage as predetermined variables in our regressions. In addition, with eight dependent and 18 independent variables, it is not possible to develop a parsimonious system of equations. Although this is a limitation of the study, the empirical results provide many implications for future research and are discussed further in section 4.3. The cluster analysis that we perform next recognizes that firms may use various combinations of performance measures, incentives, delegation, and strategy and is free of assumptions regarding which variables are predetermined versus choice variables.

4.2 Cluster Analysis

We use cluster analysis to identify performance measurement, organizational design and strategy characteristics of firms that co-exist. Consistent with the regression analyses, we control for the entrepreneurial variables. We form the clusters using the Ward's method within the hierarchical agglomerative technique, since this method minimizes the variance within each cluster (Hair et al., 1998) To determine the appropriate number of clusters we followed the procedure outlined in Chenhall &

Langfield-Smith (1998). First, we reviewed the dendrogram and second, we plotted the number of clusters against the fusion point and looked for spots where the line flattened. We determined that a 3-, 4- or 5-cluster solution was appropriate and reviewed both the 3- and 5-cluster solutions. We found Clusters 2 and 3 were identical in both solutions, while the 5-cluster solution was formed when Cluster 1 in the 3-cluster solution split into Clusters 1, 4, and 5 in the 5-cluster solution. We conclude that the 3-cluster solution best serves our purposes since it provides larger clusters, but enough detail to adequately describe the firms and separate performance.

Table 7 shows the means of the factor scores for each cluster. Recall that performance measures, strategy, incentives and delegation are factor scores with a mean of 0 and a standard deviation of 1. In the cluster analysis, we also standardize the control variables so none of them exert undue influence on the cluster solution, although we show the actual variable means (unstandardized) in table 7 (Hair et al., 1998). We label Cluster 1 as “Accounting Control,” Cluster 2 as “Entrepreneurial Control,” and Cluster 3 as “Diversified Control.” Firms in Accounting Control rely moderately on the use of various accounting performance measures in evaluating subordinate behavior (e.g., financial measures, customer profitability, product revenue and profitability). They combine this accounting-based control with high levels of delegation across human resources, product and sales decisions, high use of stock options (moderate overall use of incentives), and low use of entrepreneurial oversight. They believe their source of competitive advantage is external to the firm, deriving from the use of linkages between websites on the internet. It appears that they rely on incentives more than performance measurement to motivate behavior, which is consistent with their delegation of decision rights.

Firms in Entrepreneurial Control have a low level of use of performance measures, a low level of delegation, and a low use of incentive compensation. They believe that their source of competitive advantage is through the development of customer lists. These firms have a high level of entrepreneurial control in that the cluster has the highest percentage of founders that are still CEOs and the highest level of ownership by venture capitalists. One implication may be that the continuing presence of the founder and venture capitalists has not facilitated the development of control and organizational design

components.

Firms in Diversified Control have a high use of diverse performance measures. They have a moderate use of delegation and stock options, although they are the highest users of bonus compensation. They have moderate levels of entrepreneurial control, and interestingly, they are the youngest and smallest of the clusters of firms. They believe they have strong sources of competitive advantage across all five strategic categories (intellectual capital, customer, product, operations, and financial).

We investigate whether the clusters differ in terms of use of measures used to allocate bonus and option compensation. We find that Entrepreneurial Control firms rely more on the use of BON_FINL REV and OPT_FINL REV than do Accounting Control firms (mean of 7.50 vs. 4.04, $p < 0.10$; mean of 5.63 vs. 2.30, $p < 0.05$, respectively). We also find that Entrepreneurial Control firms rely more on OPT_FINL REV than do Diversified Control firms (mean of 5.63 vs. 2.43, $p < 0.05$).

Finally, we are interested in whether the clusters are “equivalent” in fit, in which case we should not detect a difference in performance, or whether one cluster outperforms the other clusters. We find that the clusters differ in performance primarily measured as growth compared to the industry using the following questions: (1) in terms of revenue how large is your firm compared to others in your industry (1= highest revenue in industry, 7 = lowest revenue in industry; reverse coded), (2) how does your firm’s annual growth in terms of customers compare to the industry average, and (3) how does your annual rate of growth in sales compare to the industry average (7 = performance well below industry average, 1 = performance well above industry average; reverse coded). We perform three different comparisons to gain insights on performance by cluster: (1) test of question 1; (2) test of a factor using q1 and q2; and (3) test of a factor using all three questions. Across all three tests we find that Accounting Control and Entrepreneurial firms are not significantly different from each other. Across all three tests we find that Entrepreneurial firms are significantly lower performing than Diversified Control firms ($p < 0.05$, $p < 0.01$, $p < 0.05$, respectively). Finally, across two of the three tests we find that Accounting Control is significantly lower performing than Diversified Control ($p < 0.10$, $p < 0.05$, $p < 0.20$).

4.3 Discussion of Results and Development of Research Propositions

In this section we draw on general theory, our previously described empirical results, and other studies' empirical findings in order to propose several specific research propositions. We envision that these propositions will advance theory and guide future empirical research. Relying on our propositions, researchers can test more specific relations in management accounting practice.

4.3.1 Strategy

The service operations and marketing literatures emphasize the role that employee knowledge and operations have on customer outcomes (Heskett, Sasser, & Schlesinger, 1997; Rust, Zeithaml, & Lemon, 2000). Rust et al. (2000) develop the customer equity framework which hypothesizes that customer value, retention, and loyalty are gained through delivering high quality operations. Our results show that firms focus on measures of inputs to the customer process (i.e., satisfaction) when they have a competitive advantage based on their employees (i.e., knowledge and services in the form of intellectual capital); conversely when firms rely on operations-related sources of competitive advantage (e.g., searchability and website capabilities) firms rely on the use of customer outcome metrics (size, value, and profitability). Website capabilities are positively associated with the use of customer value and profitability measures. Searchability is positively driven by linkages among firms on the internet and negatively by an easy to find name. The negative relation between searchability as a competitive advantage and both customer size and value indicates that the reliance on an easy to find name is positively associated with both customer size and value. These findings, coupled with the operations literature, suggest that measuring customer satisfaction is essential when a firm's strength is its people, but when the firm's strength is in the quality of its operations then it measures customer outcomes. We propose that:

Competitive advantage based on operations is positively associated with the use of customer outcome measures (size, value, and profitability) while competitive advantage based on intellectual capital is positively associated with the use of customer input measures (customer satisfaction).

Bisbe & Otley (2004) in their discussion of the relation between product innovation and management control systems note that the evidence thus far is very mixed with no resolution regarding

whether management control fosters or inhibits product innovation. Davila (2000) suggests that management control systems are used to manage the uncertainty that underlies product innovation and that the management control system will vary depending on the type of uncertainty being managed. Our results are consistent with Davila (2000) since we conclude that product innovation may be too broad of a concept and that the results may differ depending on whether the study is investigating product development (e.g., proprietary technology and first to market) or product breadth. These are driven by different uncertainties and thus require reliance on different measures. In one of Davila's case studies he concludes that the firm uses the management control system to monitor costs and budgetary information by exception when their strategy is based on time-to-market. Although he didn't support this empirically, our results do since we find that product development has a positive association with the use of cost and budgetary information such as gross margin and variances. In addition, we find that firms monitor measures related to the new products being introduced. In contrast, when a firm's strength is in their product breadth then they rely more on overall measures of revenue. It seems likely that firms will monitor revenue measures since Kekre & Srinivasan (1990) found that a broader product line was associated with increased selling prices and thus increased revenues. We propose the following:

Competitive advantage based on product *development* is positively associated with the use of product and budgetary financial measures (such as gross margin and variances) when evaluating subordinate performance. However, competitive advantage based on product *breadth* is positively associated with financial revenue measures.

Kaplan & Norton (1996) posit that reputation is a driver of customer outcomes such as market share. Reputation provides customers with a differentiating characteristic upon which to make a selection. Fombrun (1996) likens reputation to a warranty—reputation provides a signal that the relation between the company and the consumer will be a fulfilling, pleasant, and high-quality experience. Thus customers are attracted to purchase product based on the firm's corporate and brand reputation, resulting in an intangible referred to as brand equity (Fombrun, 1996; Chaudhuri, 2002). Chaudhuri (2002) provides an empirical test of a brand equity model in which the evidence demonstrates the existence of a positive relation between brand reputation and market share. This is consistent with our finding that a competitive

advantage based on reputation is positively associated with the use of customer size performance measures (e.g., market share). Since reputation leads to market share, it is likely that firms will monitor market share to provide feedback on the source of their competitive advantage. We propose that:

Competitive advantage based on reputation is positively associated with the use of customer size measures when evaluating subordinate performance.

4.3.2 Decision Rights

The delegation of broad decision rights may be characterized as a *general* right of control. Trying to observe and measure outcomes for general rights may be quite costly (Grossman & Hart, 1986); therefore, summary outcome measures are often used to evaluate behavior. This has the added benefit of providing the employee with the ability to take unrestricted actions as long as the result is improved performance. For example, managers with profit center responsibilities are often evaluated on the basis of aggregate financial measures since this allows the manager to take unrestricted actions as long as the result is improved financial performance (e.g., Abernethy et al., 2004) and is less costly to monitor (Grossman & Hart, 1986). In other words, with broad decision rights the employee is usually evaluated at a macro-level, instead of at a micro-level. The delegation of human resource management can be viewed as a *general* right of control since it places the control of the department in the hands of its employees. Accordingly, it is likely that the employees to which these decision rights are granted are evaluated on summary financial measures, which are less costly to implement and allow the employees the latitude necessary to take many alternative courses of action in order to accomplish departmental objectives. Our findings indicate that when human resource decisions are delegated to employees such that employees have a right to shape their department through hiring, firing, promoting, and engaging in other human resource activities, they are held accountable for summary financial measures of net income, budget variances, and gross margin. They are not micro-managed through the use of more specific, non-financial measures.

Conversely, the delegation of product decisions is a *specific* right of control. Employees

have been delegated *specific* decision rights related to products and will be evaluated on available measures of observable performance (Grossman & Hart, 1986). Measures that are specific to decision rights over products are likely to include product- and customer-related measures, consistent with our empirical findings. Our empirical findings and the theory we cite lead to the following proposition:

Firms that delegate human resource decisions to subordinates rely more on summary financial measures (net income, variances from budget, and gross margin).

Firms that delegate product decisions to subordinates rely more on product measures, customer satisfaction measures, and customer profitability measures when evaluating subordinate performance.

4.3.3 Incentives

Annual bonus incentives are short-term rewards intended to compensate employees for current performance (Milkovich & Newman, 2002). Annual bonus incentives are also used to keep employees happy, satisfied, productive, and motivated in the short-run. Our empirical findings show that annual bonus compensation is positively associated with short-run financial revenue measures and employee measures. This is consistent with theory since it is well-acknowledged that financial accounting measures report on past activities (Hall, 2000). Conversely, stock options are intended to compensate employees for long-term performance since options have a longer time horizon relative to annual cash bonuses and usually vest over a three to five year window (Hall, 2000; Milkovich & Newman, 2002). Employee, customer, and new product development measures are forward-looking measures that provide information for a longer time horizon and ultimately culminate in financial performance. Our empirical findings show that the use of stock options is positively associated with the use of performance measures across all four of these categories, which is consistent with the notion that options should be tied to measures related to long-term performance. Thus we propose the following:

Incentive compensation in the form of annual cash bonuses is positively associated with the use of measures related to employees (an input to the production process) and revenues (a final financial outcome from operations).

Incentive compensation in the form of stock options is positively associated with the four general categories of the firm's performance drivers: revenue, customers, products, and

employees.

4.3.4 Entrepreneurial Oversight and Performance

Organizations become more formal and structured when the founder, who is more entrepreneurial by nature, is replaced by a professional CEO (Greiner, 1998). Davila (2005) argues that entrepreneurs are vision oriented and may assume that others in the organization share in that vision. Thus founder CEOs do not advocate controls since they are not concerned with the need to motivate and align employee behaviors. Moreover, venture capitalists could act as an alternative form of monitoring, and thereby reduce the need for a strong performance measurement system. Our results indicate that firms characterized by the presence of CEOs that are also founders and by a higher ownership of venture capitalists appear to rely on themselves to control activities within the firm and do not rely on the use of incentive compensation or performance measures. Moreover, the empirical results indicate that these types of firms tend to delegate few decisions. We propose the following:

Firms with high levels of entrepreneurial characteristics (i.e., CEO founder, venture capitalist ownership) rely less on the delegation of decision rights and less on incentive compensation and the use of performance measures.

There is a body of contingency literature that suggests that particular contextual variables and control components must “fit” in order for performance to be high (e.g., Chapman, 1997; Chenhall, 2003). For example, Abernethy & Brownell (1997) find that the use of accounting controls positively affects performance when task uncertainty is low. Conversely, when task uncertainty is high then reliance on personnel controls is positively associated with performance. Our results indicate that firms that rely on a high diversity and use of measures outperform firms that have a low use of measures or rely on alternative forms of control. This is consistent with research that suggests that a greater diversity of measures is associated with higher performance. For example, Ittner et al. (2003) find that more extensive use of multiple measures is associated with better performance as measured by stock returns. Thus we propose the following:

Firms that rely on entrepreneurial control (i.e., CEO founder, venture capitalist ownership) are lower performing relative to those firms with organizational design control (i.e., performance measures, delegation, and incentives).

Firms that rely on a diverse set of performance measures to evaluate subordinate behavior are higher performing relative to those firms that have a low use of diversified measures or who rely on accounting measures.

Firms that couple moderate use of delegation, incentives, and entrepreneurial control, along with a high use of diversified performance measures (i.e., Diversified Control firms) outperform Accounting Control or Entrepreneurial Control firms.

4.3.5 Use of Performance Measures for Multiple Purposes

Managers have a portfolio of performance measures available for use in leading the firm. They use some measures to facilitate decision making and they use some measures to influence behavior (Demski & Feltham, 1976). Most existing research has examined information in either the decision facilitating role or in the decision influencing role (Sprinkle, 2003). In addition, theoretical papers have shown that the weight placed on information used externally should differ from that used internally (Gjesdal, 1981; Paul, 1992). Thus, generally, we would expect different weights on different measures for different purposes. Our univariate results indicate that firms weight the same performance measures differently to determine bonus compensation or option compensation (see Table 5). However, the regression results go slightly further and show that the measures used for performance evaluation of subordinates are not always the same as the measures used for rewarding employees. Thus, not only do the weights differ, but the information itself differs. For the specific context that we examine of internal decision making and reward, we propose the following:

Firms do not always use the same performance metrics for reward as they use for evaluation.

5. Conclusions and Discussion

In this study we perform an in-depth investigation of the use of performance measures. We investigate three broad research questions. First, after controlling for entrepreneurial factors, do strategy and organizational design factors drive the use of performance measures for the evaluation of subordinates in high-tech firms? Second, do the dimensions of strategy and organizational design vary across different categories of performance measures? Third, what are the profiles of firms that use similar

types of performance measurement systems and organizational design components? Overall, the results show that strategy and organizational design (i.e., delegation of decision rights and incentives) significantly explain the use of eight types of performance measures. Our results also suggest that *different* dimensions of strategy and organizational design explain the use of performance measures in *different* performance measure categories, which is consistent with the dominant paradigm in practice that performance measurement systems are multi-faceted in nature (e.g., the balanced scorecard). We also identify three clusters of firms with similar characteristics that we label: Accounting Control, Entrepreneurial Control, and Diversified Control.

The study relies on data from 53 firms, which is a small sample, yet we find many significant results. Although we design our study in such a way as to minimize biases common to survey research designs, we acknowledge that survey measures can be noisy. Despite these limitations, this study makes several contributions to the literature. Ittner and Larcker (2001) state that by ignoring various contingency factors our understanding of non-financial value drivers are rudimentary. We expand our understanding of the use of performance measures by adopting multiple proxies for strategic and structural contingency factors and then examining their associations with the use of performance measures across eight different categories. One theoretical implication of our study is that if we understand better the determinants of performance measures then we can better specify the relation between performance measures and performance. For example, we find that competitive advantage related to knowledge is a determinant of customer satisfaction measures; perhaps the reason that some studies find mixed results for the association between the use of customer measures and performance is that the true underlying relation depends on whether the firm is pursuing a strategy based on knowledge or perhaps the study is focusing more broadly on customer measures, and not specifically enough on customer satisfaction measures.

Our findings suggest that future research that investigates whether the use of customer measures affects performance should consider that this relation may depend on whether the firms use stock options, delegate sales and human resource decisions, or have a competitive advantage based on financial capital, intellectual capital, or reputation. Future research could investigate these relations perhaps using an

interactive contingency model. Moreover, future research should be aware that even a “customer” typology may be too broad of a construct since different variables predict customer satisfaction, size, value, and profitability. In addition, it could be assumed that the firms in our sample are representative of both growing firms and firms employing a “prospecter-like” strategy. Yet, while we found that strategy significantly explains the use of performance measures, the strategy dimensions vary across different categories of performance measures. This implies that future research must consider more refined measures of strategy rather than looking at firm-level typologies. We also contribute to the literature through the development of specific research propositions that should help guide and direct future research. Finally, we contribute to the literature that investigates control systems in smaller, entrepreneurial firms (Chenhall, 2003). We provide evidence that traditional contingency variables related to organizational design and strategy explain management control systems even in relatively small, young, growing, high-tech firms.

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Appendix A
Survey Questions Underlying Dependent and Independent Variables

Customer Metrics

To what extent do you use each of the following customer-related metrics when evaluating the performance of your direct reports? (1=do not rely at all; 7=rely heavily):

1. Customer profitability
 2. Number of new customers
 3. Number of customer complaints
 4. Market share
 5. Dollar value per order
 6. Cost to acquire a new customer
 7. Customer lifetime value
 8. Percentage of revenues from new customers
 9. Percentage of revenues from repeat customers
 10. Percentage of revenues from barter transactions
 11. External customer satisfaction rating metrics of your firm (*e.g. BizRate, Gomez, etc.*).
 12. Internal customer satisfaction ratings
-

Employee Metrics

To what extent do you use each of the following employee-related metrics when evaluating the performance of your direct reports? (1 = do not rely at all; 7= rely heavily):

1. Employee turnover
 2. Revenue/employee
 3. Number of new hires
-

New Product
Metrics

To what extent do you use each of the following new product metrics when evaluating the performance of your direct reports? (1 = do not rely at all; 7= rely heavily):

1. Number of new products introduced
 2. Revenue from new products
 3. Market share from new products
 4. Profitability of new products
-

Financial Metrics

To what extent do you use each of the following financial metrics when evaluating the performance of your direct reports? (1 = do not rely at all; 7= rely heavily):

1. Net income
2. Firm revenue
3. Revenue by product line
4. Growth in revenue
5. Variance from budget
6. Gross margin

Incentive

%BONUS

What percentage of your direct reports' annual compensation, on average, is derived from bonus?

%OPTION

What percentage of your direct reports' annual compensation, on average, is derived from Stock Options?

Decision

Rights

Each of the questions regarding Decision Rights below elicits a response on the scale here (1=my direct reports take action on their own without consulting me; 7=I decide on the action to take or decision to be made; my direct reports have no influence): (Reverse Coded)

How are the following operational decisions made?

- Setting a new sales strategy?
- Discontinuing a product line or major product?
- Setting prices for products?

How are the following personnel decisions made?

- Hiring someone to join the Sales Department?
- Terminating an employee within the Sales Department?
- Determining the number of personnel needed within the Sales Department?

How are the following compensation decisions made?

- Formally evaluating the performance of the employees who report to your direct reports?
 - Promoting an employee within the Sales Department?
-

Strategy
Competitive
Advantage

Each of the questions regarding Competitive Advantage below elicits a response on the scale here (1=this is a very strong and important source of our competitive advantage; 7=we are equivalent to our competitors on this dimension): (Reverse Coded)

Please rate each of the following potential sources of competitive advantage on a scale from 1) to 7) where 1) this is a very strong and important source of our competitive advantage through 7) we are equivalent to our competitors on this dimension:

- a. Speed of website
- b. Website customization
- c. Ease of use of website
- d. Lower prices
- e. Timing (first to market)
- f. Lower costs
- g. Service (including returns)
- h. Product breadth
- i. Linkages with other firms
- j. Brand Name
- k. Human capital
- l. Customer lists
- m. Proprietary technology that cannot be replicated
- n. Superior product knowledge
- o. Strong personal relationships with customers
- p. Reputation of the company
- q. Superior inputs (other than human capital)
- r. Product depth
- s. Inventory management
- t. Financial capital
- u. Unique product features
- v. Employee training
- w. Effective management structure
- x. Easy to find web domain name

Entrepreneurial
and Control

Is the founder of your company currently the firm's CEO? (1=yes, 0=no)

Approximately what percentage of the firm's outstanding shares do Venture Capitalist shareholders own? _____

How long has your firm been in existence (**year and month, if possible**)?

Table 1
Sample Selection

The sampling frame consists of B2C Internet companies with a high volume of web traffic according to Nielsen/Netratings. Between the gathering of the web traffic data and our solicitation, firms discontinued operations, were purchased, or purchased other firms. Those firms did not make our sample. For some firms, we were unable to contact the appropriate person in the organization, and some firms refused to participate.

	Number	Percentage
Sampling frame of B2C Internet companies	99	
Companies that discontinued operations prior to study	7	
Companies in reorganization at time of study	5	
Surviving firms from which to sample	87	100
Companies for which contact was not made	24	28
Companies refusing to participate	10	11
Sample of participating firms	53	61

Table 2
Descriptive Statistics for Participating Firms

The sample consists of 53 B2C Internet companies. The firms' main market segments are as self-reported in the survey. Firm revenue is gathered from proxy statements. Full-time equivalent employees, direct reports, and firm age are as reported by the participant.

Table 2A: Market Segment of Participating Firms

Market Segment	# Firms	Percent
E-tailing	5	9.43
E-services	15	28.30
Portals	7	13.21
Content/community	16	30.19
Financial news/services	7	13.21
E-tailing and content/community	2	3.77
Content/community and financial news/services	1	1.89
	<u>53</u>	<u>100.00</u>

Table 2B: Descriptive Statistics of Participating Firms

	Mean	Std. Deviation	Percentiles		
			25	Median	75
Sales (000,000)	160.78	313.84	20.78	39.87	104.58
Total Assets (000,000)	386.20	706.82	46.13	113.78	186.57
Number of Full Time Equivalent Employees	688	1,664	123	180	350
Net Income after Taxes and Extraordinary Items	(221.61)	1,115.63	(78.60)	(40.33)	(19.92)
Unique Audience (000)	6,373	10,811	1,002	3,261	7,928
Page Views (000)	530,475	1,959,424	14,701	48,648	187,743
% Sales to Repeat Customers	51	24	30	55	70
Number of Competitors	93	236	5	7	38
Size of Sales/Marketing Department	68	151	14	25	65

Table 3

Descriptive Statistics for Survey Questions

The questions used to elicit the survey responses summarized in this table are provided in Appendix A.

Panel A: Performance Measures (*use of performance measures in subordinate evaluation where 1 = do not rely at all; 7 = rely heavily*)

	Mean	Median	Std. Dev.
Customer profitability	3.40	3	2.24
Number of new customers	5.28	6	1.69
Number of customer complaints	3.91	4	1.90
Market share	3.53	4	2.11
Dollar value per order	4.26	5	2.01
Cost to acquire a new customer	3.83	4	2.30
Customer lifetime value	4.30	5	1.76
Percentage of revenues from new customers	4.98	5	1.72
Percentage of revenues from repeat customers	5.02	5	1.70
External customer satisfaction ratings (<i>e.g. BizRate, Gomez, etc.</i>)	2.87	3	2.03
Internal customer satisfaction ratings	3.63	4	2.15
Employee turnover	3.70	4	1.85
Revenue/employee	4.81	5	2.07
Number of new hires	2.87	3	1.96
Number of new products introduced	3.25	4	2.29
Revenue from new products	4.45	5	2.31
Profitability of new products	4.19	5	2.50
Net income	3.72	4	2.42
Firm revenue	5.13	6	2.13
Revenue by product line	4.45	5	2.12
Growth in revenue	5.25	6	1.76
Variance from budget	5.45	6	1.67
Gross margin	3.36	4	2.16

Panel B: Organizational Design (*level of incentives varies from 0% to 100%*) (*delegation of decision rights where 1 = I decide on the action to take or decision to be made; my direct reports have no influence; 7 = my direct reports take action on their own without consulting me*)

	Mean	Median	Std. Dev.
Incentive			
% BONUS	22.47	20	15.67
% OPTION	7.84	5	7.55
Decision Rights Variables			
Set sales strategy	2.69	3	1.23
Set sales budget	2.08	1	1.38
Discontinue product lines	2.34	2	1.45
Set prices	3.06	3	1.71
Hire	3.38	3	1.72
Terminate	2.85	3	1.73
Modify personnel policy	2.63	3	1.40
Determine number of personnel	2.44	2	1.27
Determine bonuses and raises	2.02	2	1.24
Determine non-pecuniary rewards	2.86	3	1.77
Promotion	2.86	3	1.63
Set initial salary	2.37	2	1.33

Table 3
Descriptive Statistics for Survey Questions - continued

The questions used to elicit the survey responses summarized in this table are provided in Appendix A.

Panel C: Strategy (*competitive advantage where 1= we are equivalent to our competitors on this dimension; 7= this is a very strong and important source of our competitive advantage*)

	Mean	Median	Std. Dev.
Speed	3.66	4	2.16
Customize	4.23	5	2.26
Ease of use	4.79	5	2.07
Low price	3.38	3	2.19
Timing	4.49	5	2.16
Low cost	4.08	4	2.07
Service	4.67	5	1.77
Product breadth	4.85	5	1.65
Linkages	4.08	4	1.92
Brand name	5.49	6	1.80
Human capital	5.19	6	1.71
Customer lists	3.91	4	1.85
Proprietary tech	4.02	4	2.01
Superior product knowledge	4.89	5	1.63
Strong personal relationships	4.72	5	1.85
Reputation	5.47	6	1.64
Superior inputs	3.44	3	2.20
Product depth	4.34	5	1.63
Inventory management	4.29	4	2.46
Financial capital	4.12	4	2.25
Unique product features	4.57	5	1.69
Employee training	3.38	3.5	1.82
Effective management structure	4.33	4.5	1.79
Easy to find name	4.55	5	2.20

Panel D: Control Variables (Entrepreneurial)

	Mean	Median	Std. Dev.
CEO_F	0.28	0	0.45
%VC_OWN	0.08	0	0.12
LN_SIZE	18.62	18.59	1.34
AGE	7.91	6	6.16

Table 4
Factor Extractions

The questions used to elicit the survey responses summarized in this table are provided in Appendix A. Values in **bold** are used to interpret the factor. Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization.

Panel A: Performance Measures

	PM_FINL REV (1)	PM_PROD (2)	PM_FINL OTH (3)	PM_CUST SAT (4)	PM_CUST SIZE (5)	PM_CUST VAL (6)	PM_EMP (7)	PM_CUST PROF (8)
Customer profitability	(0.094)	(0.013)	0.049	(0.164)	0.034	0.148	(0.205)	0.958
Number of new customers	0.180	0.004	(0.230)	0.102	0.291	(0.215)	0.231	0.573
Number of customer complaints	(0.114)	0.147	0.035	0.134	0.676	(0.002)	0.137	0.169
Market share	0.251	(0.150)	(0.243)	(0.060)	0.752	0.033	0.195	0.065
Dollar value per order	0.183	0.080	(0.077)	(0.669)	0.304	0.358	(0.173)	(0.091)
Cost to acquire a new customer	(0.298)	(0.078)	0.227	0.152	0.011	0.759	0.122	0.273
Customer lifetime value	0.265	0.058	(0.002)	(0.063)	(0.048)	0.749	0.167	(0.120)
Percentage of revenues from new customers	0.597	0.046	0.214	(0.291)	(0.071)	(0.032)	0.104	0.237
Percentage of revenues from repeat customers	0.839	(0.075)	0.010	0.010	0.003	0.077	0.088	(0.155)
External customer satisfaction rating metrics of your firm (e.g. BizRate, Gomez, etc.)	0.274	(0.011)	(0.056)	0.700	0.104	0.353	(0.179)	0.085
Internal customer satisfaction ratings	0.001	0.179	(0.006)	0.776	0.158	0.016	0.048	(0.213)
Employee turnover	0.045	0.161	0.055	0.063	0.130	0.127	0.928	(0.130)
Revenue/employee	0.862	(0.066)	(0.138)	0.191	(0.011)	0.120	0.139	0.014
Number of new hires	0.151	(0.013)	0.264	(0.101)	0.301	0.199	0.636	(0.003)
Number of new products introduced	(0.375)	0.723	(0.052)	(0.120)	0.459	(0.054)	(0.043)	(0.020)
Revenue from new products	0.176	0.901	(0.061)	0.099	(0.136)	0.073	(0.002)	(0.076)
Profitability of new products	(0.082)	0.914	0.002	0.156	(0.122)	0.188	0.156	0.064
Net income	(0.099)	(0.211)	0.560	0.223	0.618	(0.132)	0.043	(0.149)
Firm revenue	0.470	0.232	0.244	0.048	0.108	(0.152)	(0.299)	0.212
Revenue by product line	0.085	0.780	0.043	(0.017)	(0.025)	(0.250)	0.145	0.007
Growth in revenue	0.613	0.070	0.359	0.057	0.089	(0.220)	(0.175)	(0.103)
Variance from budget	0.050	(0.021)	0.824	(0.164)	(0.179)	(0.004)	0.387	0.016
Gross margin	0.070	0.039	0.744	0.089	(0.057)	0.339	(0.124)	0.008
Cronbach's alpha	0.795	0.857	0.643	0.564	0.599	0.530	0.749	0.531
% of Variance Explained (Individual)	62.559	64.159	59.173	54.33	56.084	68.679	79.979	68.804

Table 4
Factor Extractions - continued

The questions used to elicit the survey responses summarized in this table are provided in Appendix A. Values in **bold** are used to interpret the factor. Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization.

Panel B: Decision Rights

	DR_HR	DR_PROD	DR_SALES
Set sales strategy	(0.110)	0.325	0.693
Set sales budget	(0.088)	0.017	0.894
Discontinue product lines	0.059	0.873	(0.009)
Set prices	(0.041)	0.817	0.146
Hire	0.871	(0.110)	0.086
Terminate	0.835	(0.063)	0.110
Modify personnel policy	0.346	(0.351)	0.465
Determine number of personnel	0.697	(0.022)	0.045
Determine bonuses and raises	0.674	0.214	(0.028)
Determine non-pecuniary rewards	0.330	0.194	0.457
Promotion	0.958	(0.046)	(0.128)
Set initial salary	0.673	0.361	(0.213)
Cronbach's alpha	0.891	0.818	0.667
% of Variance Explained (Individual)	64.885	85.103	75.191

Table 4 - continued
Factor Extractions

The questions used to elicit the survey responses summarized in this table are provided in Appendix A. Values in **bold** are used to interpret the factor. Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization.

Panel C: Strategy

	CA_INTCAP	CA_CUSREP	CA_PRODDEV	CA_OPSEWB	CA_FINCAP	CA_FINMRGN	CA_CUSLST	CA_PROBRD	CA_OPSSRCH
Speed	0.033	(0.076)	(0.003)	0.821	0.410	0.076	0.064	(0.114)	0.153
Customize	(0.207)	(0.223)	0.341	0.570	(0.326)	0.185	0.220	0.200	0.186
Ease of use	(0.080)	0.089	(0.078)	0.921	0.115	(0.219)	0.233	(0.102)	(0.049)
Low price	0.074	(0.058)	0.238	0.021	0.092	0.823	(0.263)	0.077	(0.125)
Timing	(0.045)	0.043	0.759	(0.090)	(0.120)	0.130	0.226	0.130	0.158
Low cost	0.194	(0.101)	(0.288)	0.244	0.766	0.136	(0.059)	0.255	0.032
Service	0.838	(0.025)	(0.074)	(0.030)	0.079	0.015	(0.230)	0.188	0.228
Product breadth	(0.115)	0.062	(0.058)	(0.139)	0.215	(0.004)	0.031	1.010	0.221
Linkages	0.386	0.166	0.093	0.136	0.001	(0.106)	(0.081)	0.230	0.914
Brand name	(0.140)	0.877	(0.113)	0.313	(0.153)	(0.450)	(0.106)	(0.033)	0.125
Human capital	1.129	(0.168)	(0.087)	(0.138)	(0.026)	(0.055)	0.293	(0.239)	0.192
Customer lists	0.146	(0.110)	(0.092)	0.311	0.151	(0.058)	0.888	0.036	(0.110)
Proprietary tech	(0.125)	(0.034)	0.883	0.135	(0.025)	0.072	(0.269)	(0.189)	0.130
Superior product knowledge	0.548	0.051	0.351	0.256	(0.042)	(0.045)	0.025	(0.342)	0.011
Strong personal relationships	0.241	0.607	0.267	(0.040)	0.032	0.304	(0.012)	(0.201)	0.123
Reputation	(0.116)	0.951	(0.053)	(0.179)	0.094	0.161	(0.087)	0.130	0.103
Superior inputs	(0.238)	0.212	0.358	0.265	0.572	0.008	0.006	0.019	(0.241)
Product depth	0.246	0.040	0.536	(0.264)	0.263	(0.162)	0.045	0.006	(0.053)
Inventory management	0.170	(0.168)	0.237	0.196	(0.005)	(0.680)	(0.251)	0.122	0.096
Financial capital	(0.129)	0.008	0.122	0.061	0.768	(0.015)	0.449	0.060	0.137
Unique product features	0.094	(0.163)	0.540	(0.149)	(0.021)	(0.268)	0.057	0.268	(0.247)
Employee training	0.302	0.420	0.054	(0.049)	(0.065)	0.086	0.112	0.163	(0.239)
Effective management structure	0.405	0.278	(0.010)	0.065	(0.096)	(0.022)	0.231	0.317	0.016
Easy to find name	0.290	0.015	(0.226)	0.366	(0.059)	0.228	0.069	(0.024)	(0.528)
Cronbach's alpha	0.718	0.724	0.694	0.686	0.629	0.334	n/a	n/a	0.197
% of Variance Explained (indiv)	63.96	64.95	52.94	61.77	57.50	59.99	n/a	n/a	55.51

Table 5
Regression Results

These measures form the dependent variables for the Regression in Table 6, Panel E. They are computed by examining the top five measures used for evaluation and weighting them based on the respondents' use for bonus and option compensation.

Measure	# of Times Measure Given	Determination of Annual Bonus				Determination of Stock Options			
		Total Weight: Revenue (Factor 1)	Total Weight: Financial Other (Factor 3)	Total Weight: Customer Profitability (Factor 8)	Average Weight per Times Given	Total Weight: Revenue (Factor 1)	Total Weight: Financial Other (Factor 3)	Total Weight: Customer Profitability (Factor 8)	Average Weight per Times Given
Revenue	16	80			5.00	54			3.38
Growth in revenues	16	81			5.06	61			3.81
Revenue/employee	7	43			6.14	31			4.43
Revenue: new customers	8	38			4.75	14			1.75
Revenue: repeat customers	8	24			3.00	18			2.25
Budget variances	23		119		5.17		108		4.70
Gross margin	2		11		5.50		8		4.00
Net income	6		31		5.17		19		3.17
# of new customers	16			65	4.06			40	2.50
Customer profitability	6			30	5.00			14	2.33

Table 6
Regression Results

The questions used to elicit the survey responses summarized in this table are provided in Appendix A.

Panel A: Dependent Variables are Financial Performance Measurement Use

	PM_FINL REV (1)		PM_FINL OTH (3)	
	Std. Coefficient	P-value	Std. Coefficient	P-value
Intercept	4.707	.013	3.786	.054
%BONUS	0.276	.019	-.269	.049
%OPTION	0.184	.091	-	-
DR_HR	-	-	0.412	.004
DR_SALES	-	-	-.293	.054
CA_PROBRD (8)	0.177	.088	-	-
CA_PRODEV (3)	-	-	.241	.035
LN_SIZE	-0.380	.007	-0.256	.065
%VC_OWN	-	-	0.253	.055
Adj. R2	0.165		0.165	
F-value (p-value)	3.575 (.012)		2.714 (.024)	

Panel B: Dependent Variables are Customer Performance Measure Use

	PM_CUST SAT (4)		PM_CUST SIZE (5)		PM_CUST VAL (6)		PM_CUST PROF (8)	
	Std. Coef.	P-value	Std. Coef.	P-value	Std. Coef.	P-value	Std. Coef.	P-value
Intercept	-.381	.037	.270	.224	.516	.042	-.167	.267
%BONUS	-	-	-	-	-.285	.035	-	-
%OPTION	.367	.004	-	-	-	-	-	-
DR_HR	-.243	.083	-	-	-	-	-	-
DR_PROD	.400	.002	-	-	-	-	.240	.034
CA_FINCAP (5)	.209	.046	-	-	-	-	-	-
CA_INTCAP (1)	.364	.003	-	-	-	-	-	-
CA_CUSREP (2)	-	-	.298	.015	-	-	-	-
CA_OPSSRCH (9)	-	-	-.317	.028	-.230	.091	-	-
CA_OPSSWEB (4)	-	-	-	-	.202	.067	.355	.006
CA_FINMRGN (6)	-	-	-	-	-	-	-.262	.050
CA_PRODEV (3)	-	-	-	-	-	-	-.207	.131
CEO_F	-	-	.173	.190	-.173	.194	.268	.042
AGE	-	-	-.048	.040	-	-	-	-
Adj. R2	0.292		0.176		0.117		0.170	
F-value (p-value)	5.281 (.001)		3.770 (.010)		2.722 (.040)		3.13 (.016)	

**Table 6 - continued
Regression Results**

The questions used to elicit the survey responses summarized in this table are provided in Appendix A.

Panel C: Dependent Variable is Internal Product Performance Measure Use

	PM_PROD (2)	
	<u>Std. Coefficient</u>	<u>P-value</u>
Intercept	4.271	.009
%OPTION	.164	.070
DR_PROD	.245	.014
CA_PRODEV (3)	.500	.000
CA_FINMRGN (6)	.294	.004
CA_CUSLST (7)	-.156	.155
LN_SIZE	-.312	.009
%VC_OWN	-.142	.188
Adj. R2	0.457	
F-value (p-value)	7.259 (.000)	

Panel D: Dependent Variable is Employee Performance Measure Use

	PM_EMP (7)	
	<u>Std. Coefficient</u>	<u>P-value</u>
Intercept	-4.458	.015
%BONUS	.259	.027
%OPTION	.284	.018
CA_CUSREP (2)	-.221	.100
LN_SIZE	.259	.051
%VC_OWN	.264	.039
Adj. R2	0.239	
F-value (p-value)	4.272 (.003)	

Table 6 - continued
Regression Results

The questions used to elicit the survey responses summarized in this table are provided in Appendix A.

Panel E: Dependent Variable is Use of Measures for Bonus and Options

	BON_FINL REV (1)	OPT_FINL REV (1)	BON_FINL OTH (3)	OPT_FINL OTH (3)	BON_CUST PROF (8)	OPT_CUST PROF (8)
Intercept	5.358***	3.340***	3.038***	2.547***	1.887***	1.019***
PM_FINL REV (1)	0.217*	0.139		-	-	-
PM_FINL OTH (3)	-	-	0.185*	0.054	-	-
PM_CUST PROF (8)	-	-	-	-	0.344***	0.306**
Adj. R2	0.028	0.000	0.015	-0.017	0.101	0.076
F-value	2.515	1.012	1.816	0.149	6.860**	5.2543**

***, **, * p-value < 0.01, 0.05, 0.10, respectively

Table 7
Variable Scores by Cluster

Mins and Maxes for the whole population. Means for the Cluster. Ranks from lowest (1) to highest mean (3).

** Based on a survey question asking about revenue performance versus industry (1 = low, 7 = high), clusters' 1 and 2 are relatively low performers (means of 4.656 and 4.935, respectively; not significantly different) while cluster 3 is a relatively high performing firm (mean of 5.714). Cluster 3 is significantly different from cluster 1 ($p < .05$) and cluster 2 ($p < .10$).

Cluster 1: Moderate use of accounting measures, focused operational competitive advantage based on ease of searching, high use of delegation, high use of options with moderate overall use of incentives

Cluster 2: Low use of performance measures, focused customer competitive advantage based on customer lists, low delegation, low use of incentives, oldest firms with high levels of entrepreneurial control

Cluster 3: High diversity and use of performance measures, diversified competitive advantage with strengths across all areas, moderate use of delegation, high use of incentives (especially bonus compensation)

	Min.	Max.	Cluster 1 (N=16)		Cluster 2 (N=23)		Cluster 3 (N=14)	
			Mean	Rank	Mean	Rank	Mean	Rank
<i>PM Financial</i>								
PM_FINL REV	(2.490)	1.515	0.181	2	(0.420)	1	0.483	3
PM_FINL OTH	(2.014)	1.527	0.179	2	(0.258)	1	0.219	3
<i>PM Customer</i>								
PM_CUST SAT	(1.659)	2.494	(0.148)	1	(0.119)	2	0.364	3
PM_CUST SIZE	(1.746)	2.247	(0.205)	2	(0.302)	1	0.730	3
PM_CUST VAL	(2.502)	1.694	(0.167)	1	(0.015)	2	0.215	3
PM_CUST PROF	(1.918)	2.317	0.041	2	(0.113)	1	0.138	3
<i>PM_PROD</i>	(2.322)	1.399	0.130	2	(0.470)	1	0.624	3
<i>PM_EMP</i>	(1.905)	2.948	(0.045)	1	(0.018)	2	0.080	3
<i>CA Intercap</i>								
CA_INTCAP	(2.883)	1.965	(0.639)	1	(0.115)	2	0.919	3
<i>CA Customer</i>								
CA_CUSREP	(2.434)	1.751	(0.476)	1	(0.137)	2	0.769	3
CA_CUSLST	(2.647)	2.179	(0.010)	2	0.044	3	(0.060)	1
<i>CA Product</i>								
CA_PRODEV	(2.836)	1.653	(0.286)	1	(0.134)	2	0.547	3
CA_PROBRD	(2.165)	2.067	(0.642)	1	(0.002)	2	0.738	3
<i>CA Operations</i>								
CA_OPSEWEB	(1.945)	2.318	(0.415)	1	(0.133)	2	0.693	3
CA_OPSSRCH	(2.888)	2.643	0.774	3	(0.236)	2	(0.496)	1
<i>CA Financial</i>								
CA_FINCAP	(2.187)	1.972	(0.221)	1	(0.043)	2	0.323	3
CA_FINMRGN	(1.799)	2.501	(0.018)	2	(0.168)	1	0.296	3
<i>DR</i>								
DR_HR	(1.520)	2.210	0.600	3	(0.512)	1	0.155	2
DR_PROD	(1.551)	2.102	0.891	3	(0.686)	1	0.109	2
DR_SALES	(1.837)	1.799	0.602	3	(0.411)	1	(0.013)	2
<i>%BONUS</i>								
%BONUS	0.00	60.000	20.719	2	18.500	1	31.007	3
<i>%OPTIONS</i>								
%OPTIONS	0.00	30.000	8.650	3	7.000	1	8.307	2
<i>CEO_F</i>								
CEO_F	0.00	1.000	0.125	1	0.435	3	0.214	2
<i>%VC_OWN</i>								
%VC_OWN	0.00	0.455	0.048	1	0.101	3	0.089	2
<i>AGE</i>								
AGE	2.748	35.022	7.113	2	9.870	3	5.585	1
<i>LN_SIZE</i>								
LN_SIZE	16.037	21.799	18.491	2	18.969	3	18.183	1

Figure 1
Hypothesized Model

