AN EXPLORATORY STUDY OF STRATEGIC PERFORMANCE MEASUREMENT SYSTEMS

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ABSTRACT

This exploratory study aims at identifying the main characteristics of strategic performance measurement systems (SPMS) that influence SPMS outcomes, which, in turn, impact firm performance. Using data from 1,990 companies in a wide range of industries, we employed path analysis and stepwise regression to test the model. We found empirical support for the model, in that SPMS have a significant effect on human resource practices and business results. The degree of BSC adoption, the impact of SPMS on human resources, the purposes for which the SPMS were designed, and the use of nonfinancial performance measures were found to have the most effect on the impact of the SPMS on business results.

1. INTRODUCTION

Strategic performance measurement systems (SPMS) have been gaining popularity in a broad range of organizations over the last decade. Organizations frequently rely on SPMS to implement organizational change, in response to a change in strategic direction. According to

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Chenhall (2005), SPMS can take many forms, but share in common a distinctive feature in that "they are designed to present managers with financial and nonfinancial measures covering different perspectives which, in combination, provide a way of translating strategy into a coherent set of performance measures" (p. 396). Examples of SPMS include performance pyramids and hierarchies (Dixon, Nanni, & Vollmann, 1990; Lynch & Cross, 1995); the service-profit chain (Heskett, Jones, Loveman, Sasser, & Schlesinger, 1994); the intangible asset scorecard (Sveiby, 1997); the *tableaux de bord* (Epstein & Manzoni, 1997); the action-profit linkage model (Epstein, Kumar, & Westbrook, 2000); and, most notably, the balanced scorecard (BSC, first proposed by Kaplan & Norton, 1992).

According to a recent survey of the Institute of Management Accountants' Cost Management Interest Group, the BSC is rated as one of the three most beneficial organizational practices, scoring even higher than cost management techniques (Krumwiede & Charles, 2006). Despite this perceived potential benefit from BSC implementation, the same survey revealed that a much lower number of respondents reports actually using the BSC in their firms. Other surveys have placed the BSC as a predominant performance measurement tool; for example, Silk (1998) estimated that three out of five Fortune 500 companies have implemented a BSC. Little is known, however, about the actual effects of BSC implementation, and whether SPMS have indeed brought about organizational change as intended.

The popularity of SPMS among practitioners has sparked a similar interest among management accounting researchers, who set out in the mid-1990s to produce a new stream of literature about the SPMS. This literature has been progressing and changing its focus gradually through three distinct phases which we characterize as: the "how-to" phase, the "what-else" phase, and the "so-what" phase.

Soon after Kaplan and Norton's seminal article on the BSC in 1992, several authors have addressed the technical aspects of "how-to" design SPMS (Neely, Gregory, & Platts, 1995; Neely, Mills, Platts, Gregory, & Richards, 1996; Kaplan & Norton, 1996). The main concern of this first phase of the SPMS literature was to prescribe for practitioners different methodologies for selecting customized performance measures that would help complex organizations implement their strategies. Researchers during this "how-to" phase did not explicitly question whether SPMS were necessary for strategy execution; the implicit assumption was that if most Fortune 500 companies, agencies at all levels of government, and charitable organizations were implementing SPMS, then they must add value.

By the late 1990s, academicians became more concerned with the process of implementing SPMS and the potential obstacles to SPMS success (Bititci, Carrie, & McDevitt, 1997; Bourne, Neely, Mills, Platts, & Wilcox, 2000). During this "what-else" phase, researchers were concerned with identifying what other variables were critical for successful SPMS implementation, the role of top-management commitment, and the indispensable need for clearly articulated strategies for SPMS to work (Kaplan & Norton, 2001a). For example, the European Foundation for Quality Management (EFQM) proposed a supplemental framework to the BSC called the Business Excellence Model, which included enablers such as leadership, policy, and strategy, which were seen as necessary antecedents to the results intended for SPMS (EFQM, 1999). While the "what-else" phase was helpful in explaining the role of contextual variables for SPMS implementation, it did not directly measure the impact of those variables on BSC design and adoption, nor did it provide consistent evidence on SPMS results.

Within the current decade, the SPMS literature has shifted its focus to ascertain if SPMS implementation has, in fact, a significant impact on business performance. This "so-what" phase started with simple tests of the impact of the use of a particular performance measure on actual financial performance (e.g., Behn & Riley, 1999, in the airline industry; Banker, Potter, & Srinivasa, 2000, in the hotel industry). More recently, the performance measurement literature has shifted to investigate the specific attributes of the SPMS and the intervening variables that link SPMS characteristics to their performance effects (e.g., Ittner, Larcker, & Randall, 2003). After evidence that some early adopters of BSC had little success with the use of more subjective, nonfinancial measures (e.g., Ittner, Larcker, & Meyer, 2003 described how a global financial services firm decided to drop the BSC in favor of an incentive compensation plan based on revenues only), performance measurement research has evolved to investigate, document, and actually measure the performance results of SPMS adoption (e.g., Burney & Widener, 2007).

This study aims at contributing to this emerging "so-what" performance measurement literature by introducing three main innovations. First, rather than conducting isolated tests of how particular features of the SPMS affect performance, we develop a comprehensive model, drawing from both the accounting and information systems literature, to describe how SPMS characteristics influence SPMS outcomes, which, in turn, affect performance. Second, we propose two new variables (design purposes and degree of BSC adoption) to investigate their role in explaining SPMS performance effects. Instead of using a dichotomous variable to classify adopters versus nonadopters of the BSC, based on the respondent's claim about whether his or her business unit adopted a BSC, we used a composite metric to capture the varying degrees of adoption of the BSC, according to Kaplan and Norton's strategic map (2001a). Third, we evaluate organizational change in terms of performance effects using a multidimensional approach, consistent with the causal models of the BSC: first, by testing for the impact of the SPMS on human resource (HR) practices; and next, by gauging business performance in both operational and financial results. We tested this model using extensive empirical data from a cross-sectional sample of 1,990 organizations, including companies from every single Dow Jones Global Industry Group. Our empirical results support the proposed model, and provide additional empirical evidence for the assertion that integrated SPMS (such as the BSC) impact performance positively.

This paper is organized in six sections. This introduction is followed by a section that identifies the model and defines the eight variables selected for this study. The third section states the research question and proposes the six hypotheses we tested empirically. The fourth and fifth sections include a description of the research methods and the results from our path analysis, respectively. In the sixth section, we offer a summary and concluding comments, and discuss the implications of this research for the ongoing SPMS literature and for practitioners interested in SPMS implementation.

2. STRATEGIC PERFORMANCE MEASUREMENT SYSTEMS

SPMS, despite the various forms in which they have been implemented, have three characteristics in common:

- they include financial measures that capture the short-term consequences of managers' decisions regarding issues such as revenue growth, asset utilization, and cash flows (Kaplan & Norton, 2001a; Rappaport, 2005);
- they supplement financial measures with nonfinancial measures that indicate operational achievements likely to drive future financial performance;
- they are designed to fulfill multiple purposes, from simple cost determination to complex value creation, with an emphasis on strategy execution.

In this study, we examine each of the above characteristics and their influence on various outcomes of the SPMS. As shown in Fig. 1, the characteristics of the SPMS are expected to determine (directly or indirectly)



Fig. 1. The Model.

the quality of the information it provides, its effectiveness, and the degree to which the BSC is adopted. These outcomes, in turn, contribute to improved firm performance, first in terms of their impact on HR practices, and next in terms of improved business results.

2.1. SPMS Characteristics

2.1.1. Use of Financial Measures

Financial measures of performance are relevant to senior managers as shortterm feedback on the results of their past initiatives aimed at increasing shareholder value. In the BSC framework, these measures address the question: "If we succeed, how will we look to our shareholders?" (Kaplan & Norton, 2001b). As listed in Fig. 1, the measures in this study are among the most popular in a diverse set of industries (AICPA & Maisel, 2001). They range from simple measures of output such as revenues and growth, to summary measures of profitability (gross margin, earnings before interest and taxes or EBIT, net operating income, and earnings per share or EPS) to comprehensive measures of profit vis-à-vis asset utilization (return-on-investment and economic value added), including also a popular liquidity measure (cash flows).

2.1.2. Use of Nonfinancial Measures

Nonfinancial performance measures are necessary to correct for several limitations inherent in financial measures: their short-term bias (which may lead managers to engage in myopic behavior, such as cutting down research and development or employee training expenses to achieve profitability targets); their high level of aggregation (which do not provide enough guidance to middle- or lower-level managers when choosing among alternative courses of action over factors they can control); and their historical focus (which do not capture improvements in quality, customer, or employee satisfaction that lead to future financial results).

Nonfinancial measures such as customer satisfaction correct for these limitations by promoting a more long-term focus (e.g., a sales manager in a car dealership aims at increasing long-term sales through improved customer satisfaction, as argued by Hemmer, 1996); by providing strategic priorities detailed for managers at all levels, based on factors they can control (Merchant & Van der Stede, 2007); and by helping to drive future performance (Ittner & Larcker, 1998b).

Nonfinancial measures are present in three perspectives of the BSC framework (Kaplan & Norton, 2001b): the customer perspective ("to achieve my vision, how must I look to my customers?"); the internal perspective ("to satisfy my customers, at which processes must I excel?"); and the learning and growth perspective ("to achieve my vision, how must my organization learn and improve?").

In our study (see Fig. 1), 10 of the most popular nonfinancial measures are included (AICPA & Maisel, 2001), encompassing the three nonfinancial BSC perspectives: customer services and satisfaction, and market share (customer perspective); quality and other process-related measures, innovation and new product development, operational time, speed and agility, and supplier, regulatory and compliance performance (internal business perspective); and productivity, employee turnover and demographics (learning and growth perspective).

2.1.3. Design Purposes

While the combination of financial and nonfinancial performance measures is not a new phenomenon (e.g., there is evidence of their use by General Electric in the 1950s, as cited in Kaplan & Norton, 2001b), a distinctive characteristic of SPMS implemented in the last two decades is an attempt to choose tailored performance measures that translate a particular organizational strategy into an integrated set of performance indicators. Thus, this set of measurements contribute to change management by fulfilling many purposes: not only to direct managerial action to the achievement of new strategic objectives, but also to provide feedback to managers, through a dynamic learning process, about the potential need for new strategy formulation (Simons, 1995). Thus, the particular purposes for which the SPMS are designed constitute a critical characteristic that determines its strategic outcomes (Chenhall, 2005). The importance of design for the ability of management control systems to mobilize change is clearly argued by Mouritsen (2005).

In the current study, the design purposes of the SPMS (as listed in Fig. 1) cover all four decision contexts described by Ittner and Larcker (2001): cost determination (e.g., measure business results); information for planning and control (e.g., evaluate individual performance, determine individual rewards and recognition, and communicate management directives); reduction of waste (e.g., manage operations, capital, and technology); and a strategic emphasis on value drivers (e.g., manage strategy, suppliers and customer relationship; communicate values and culture and support decision making). As highlighted by Ittner and Larcker (2001), SPMS research needs to clarify the purposes for which SPMS are used, since performance measures used for one purpose may not be used for other purposes, and the decision contexts for which the performance measures are designed are paramount when interpreting their outcomes.

2.2. SPMS Outcomes

In our model, we consider several desirable outcomes from SPMS implementation: information quality (are the SPMS providing high-quality information?), effectiveness (how effective are the SPMS?), and the degree of BSC adoption (to what extent have all cause-and-effect relationships of the BSC been articulated?).

2.2.1. Information Quality

Ouality of information is a concept well defined in the information systems literature, and it relates to the value, usefulness or relative importance attributed to the information by its user (Bailey & Pearson, 1983; Rainer & Watson, 1995). Despite its subjective, perceptual nature, information quality has been consistently found to be positively associated with information system success, particularly increased use and effectiveness (Srinivasan, 1985). In the performance measurement literature, information quality has been found lacking for most performance measures except for shortterm financial measures (Ittner & Larcker, 2001). For most performance measures, the perceived quality was rated much lower than the perceived importance of that measure. As Ittner and Larcker concluded, "studies investigating the internal use and benefits of these performance measures are incomplete without considering how well this information is measured" (2001, p. 384). A similar concern is expressed by Malina and Selto (2001) when examining why unreliable measures in the learning and growth perspective of an organization's BSC, fraught with low information quality, actually led this organization to drop the learning and growth perspective from its BSC altogether. Libby, Salterio, and Webb (2004) also found that higher information quality increases the chances that performance evaluators will use a more comprehensive set of unique and common performance measures in their evaluations. Kominis and Emmanuel's comprehensive study (2007) found, in fact, that the accuracy of performance measures significantly affects the value of extrinsic rewards, and the consequent motivation of managers.

Responding to these calls in the literature for more attention to information quality as an important outcome of SPMS, we have included it in our model to test its explanatory power of other SPMS outcomes and its direct and indirect effects on performance.

2.2.2. Effectiveness

SPMS effectiveness is closely related to information quality. In the information systems literature, higher information quality leads to system effectiveness, which comprises the increased use of the information, user satisfaction, and impact on the individual as well as the organization (DeLone & McLean, 1992). As catalysts of organizational change, more effective information systems have greater influence through a change in both recipient behavior and system performance (Mason & Mitroff, 1973). In the performance measurement literature (Malina & Selto, 2001), the BSC was found to be effective when it influenced motivation (employees feel that

they can control and influence their performance measures, and earn meaningful rewards and recognition) and promoted strategic alignment (a comprehensive yet parsimonious set of performance measures is causally linked to strategy, ultimately leading to improved organizational performance). Based on their extensive field research on the implementation of an effective BSC, Malina and Selto (2001) have concluded that effective management controls do not necessarily have a direct impact on performance; rather, effective management controls cause strategic alignment and effective motivation, which, in turn, cause performance improvements.

2.2.3. Degree of BSC Adoption

In addition to the two above-mentioned outcomes of the SPMS, information quality and effectiveness, in our model we also consider a third outcome, the degree of BSC adoption. This inclusion of degree of adoption of the BSC in our model follows admonitions by researchers "to devise improved methods for eliciting what firms mean by a 'balanced scorecard' and how this information is actually being used" (Ittner et al., 2003b, p. 739). Rather than simply comparing adopters with nonadopters of the BSC, for example, researchers need to probe deeper into the extent to which firms that claim to have implemented the BSC have, in fact, fully put into practice the recommendations by Kaplan and Norton (1996, 2001c).

As Chenhall (2005) noted, there is still limited evidence in the performance measurement literature about the number of organizations that have some form of SPMS, and even less research on the extent to which a more integrated form of SPMS such as the BSC is being used. On one side of the spectrum of degrees of BSC adoption, organizations have started to measure (besides accounting-based business performance, investments, and shareholder value) some combination of customer and process measures, but with a focus still on isolated key performance indicators (what Kaplan & Norton, 2001b, called "KPI scorecards"). On the other side of the spectrum, some organizations have fully deployed SPMS that are strategy-focused, comprising an integrated set of common and unique measures of performance linked through a series of cause-and-effect assumptions about how value is created.

As shown in Fig. 1, eight dimensions of the degree of BSC adoption are included in our model. Following Kaplan and Norton's BSC strategy map (2001b, Fig. 2, p. 92), we define the degree of BSC adoption as the extent to which SPMS have captured cause-and-effect relationships among the various sources of value creation, from investments to improve employee performance, compensation, reward and recognition, to technology infrastructure,

through strategic alliances with suppliers and customers, until capital investments translate into enhanced business performance and increased shareholder value. As noted by Atkinson (2001), these relationships among objectives related to customer, process, and learning and growth are decomposed or broken down and then integrated into the BSC framework in a way similar to how various operational measures were broken down and then integrated into the Dupont formula. A business unit implementing another form of SPMS that included a few, but not all, dimensions of the BSC framework, would rate low in the degree of BSC adoption scale in our study, rather than be considered simply an adopter or nonadopter.

In the practitioner-oriented performance measurement literature, several authors have also called attention to the importance of recognizing the different degrees of SPMS adoption (AICPA & Maisel, 2001; Tangen, 2005). Two potential explanations have been proposed to explain why organizations exhibit varying degrees of SPMS adoption: a cross-sectional explanation attributes different degrees of adoption to a "fit" argument (companies with more complex production technology, for example, tend to exhibit higher levels of SPMS integration and complexity to handle the information needs of managers); a time-series explanation recognizes that SPMS may evolve from existing, mostly financial-based SPMS and, as managers acquire more experience with performance measurement over time, SPMS move to a more balanced approach with the inclusion of nonfinancial measurements, up to the point when the organization adopts a fully integrated SPMS approach (Tangen, 2005).

2.3. SPMS Impact on Business Performance

Recent research on the performance effects of SPMS has established that characteristics and outcomes of the SPMS do not directly influence business performance; rather, through a complex set of cause-and-effect relationships, performance gains at different aspects of the business lead to improved overall performance (Bryant, Jones, & Widener, 2004). In our model, we evaluate how SPMS trigger organizational change by examining performance in two stages: first, the impact of SPMS on human resources practices, and second, on business results.

2.3.1. Impact on Human Resources

As depicted in Fig. 1, we identified six HR practices to gauge the impact of SPMS. Based on a review of the performance measurement literature, we selected two areas mentioned by Kaplan and Norton (2001b) in which to assess the impact of SPMS on HR practices: alignment (through leadership, organizational structure, and control practices), and focus (HR initiatives to ensure the organization possesses the skill set necessary to implement the strategy: recruitment, training, and turnover).

Leadership is an essential ingredient to successful change management. As Kaplan and Norton point out, based on their decade-long experience with over 200 executive teams designing BSC programs, "ownership and active involvement of the executive team is the single most important condition for success" (Kaplan & Norton, 2001c, p. 155). With the organization's leaders mobilized for change, SPMS require new organizational structures and control practices to restructure work flows, develop new planning and control mechanisms, and assign new responsibilities to allow all of the organization's objectives (Chenhall & Langfield-Smith, 1998).

When the existing skill set among current employees is not consistent with the requirements of the SPMS strategic programs, the organization engages in focused recruitment and training to acquire and develop strategic job-related skills, and allows turnover to resolve gaps between current skills and needed skills. This transformation in HR practices resulting from SPMS has, in fact, led to the emergence of terms like "HR scorecards" that track how well organizations have adapted their HR activities in response to the SPMS (Becker, Huselid, & Ulrich, 2001).

2.3.2. Impact on Business Results

As listed in Fig. 1, the SPMS impact on business results is reflected in changes in internal processes (research and development, product and service innovation, cycle time, process improvement programs, alliances and joint ventures), customer value (price, quality), and financial results (revenue growth, productivity), culminating in a reevaluation of the strategy itself. We purposefully selected a multidimensional approach for assessing the impact of SPMS on business results, to acknowledge that the SPMS are likely to influence many aspects of the organization, beyond just isolated financial results. Consistent with the findings by Mia and Chenhall (1994), managers that use a broad scope of information provided by the accounting system will exhibit stronger performance if differentiation of activities such as marketing is also present. As Bryant et al. (2004) revealed, the value-creation process in firms that adopt a BSC is best described by a model that allows for performance in each BSC perspective to be influenced by performance in all other BSC perspectives.

3. RESEARCH QUESTIONS AND HYPOTHESES

The hypotheses in this study stem from the following research question:

Does the strategic performance measurement system affect firm performance?

Following the path implied by the SPMS model, each variable is expected to be influenced by all the variables that preceded it. This procedure led to the formulation of the following hypotheses:

Hypothesis 1. The purposes for which the SPMS are designed are positively related to the use of performance measures.

Companies that use performance measures focused only on the financial dimension of performance (including revenues, net operating income, return-on-assets, or cash flow) will likely design the SPMS for traditional purposes such as measuring business results or evaluating individual performance. However, as evidenced in the literature, financial measures alone do not fully capture the impact of investments in firm-specific assets such as customer satisfaction or retention (Ittner & Larcker, 1998a). Companies that also use nonfinancial measures to track operational performance (including customer satisfaction, time, and new product development) will likely design the SPMS to be used for other purposes such as managing operations or customer relationships.

Hypothesis 2. The quality of the information provided by the SPMS is positively related to the use of performance measures and the design purposes of the SPMS.

As companies increase the scope of their performance measures and design the SPMS for a wide range of purposes, the quality of the information provided by the SPMS is expected to increase. With more dimensions of performance being measured, both financial and nonfinancial, managers can become more aware of the value of investments in intangible areas such as employee skills or product breakthroughs. Rather than treating such investments as simple period expenses, managers begin to see the reliability, timeliness, and accessibility of the information provided by the SPMS. As the measures become less aggregated and more detailed, leading to action, the perceived quality of the information is expected to increase. Similarly, in companies where the SPMS are designed for a wide range of purposes such as managing technology, managing operations, or determining awards, the demands placed on the SPMS to deliver high-quality information increase, so users are expected to rate the quality of information more highly. **Hypothesis 3.** The effectiveness of SPMS is positively related to information quality, the design purposes of the SPMS, and the use of performance measures.

SPMS are more likely to be effective – leading to increased use of the information, user satisfaction, and achievement of objectives – when the information quality provided by those systems is higher, as discussed in the previous section of this paper. In companies where SPMS are designed for traditional as well as strategic purposes, motivation and strategic alignment improve, translating into more effective SPMS (Malina & Selto, 2001). As companies implement an integrated set of performance measures, SPMS are capable of providing "feedback on how business activities link to strategies and to various aspects of the value chain" (Chenhall, 2005, p. 400), thus increasing the effectiveness of the SPMS (Vitale & Mavrinac, 1995).

Hypothesis 4. The degree of BSC adoption is positively related to the information quality and effectiveness of SPMS, their design purposes, and the use of performance measures.

The degree of BSC adoption refers to the extent to which the company actually deploys the SPMS for strategic purposes while maintaining an integrated set of performance measures that exhibit strong cause-and-effect relationships with various dimensions of performance. Where SPMS effectiveness and information quality are high, the organization is better equipped to actually adopt the BSC as a strategic management tool because SPMS effectively link strategic objectives to actionable metrics, helping managers focus on the critical success factors required by the strategy. If the company designed the SPMS for traditional as well as strategic purposes, it is more likely to adopt a BSC that will fully assist managers in planning, controlling, learning, and adapting the strategy based on the feedback provided by the cause-and-effect relationships found in the BSC. The use of the appropriate mix of financial and nonfinancial performance measures provides managers with the necessary information to fully adopt and implement the BSC.

Hypothesis 5. The impact of SPMS on HR practices is positively related to the degree of BSC adoption, the effectiveness and information quality of SPMS, their design purposes, and the use of performance measures.

As companies extend their actual degree of adoption of SPMS for truly strategic purposes (implementing a BSC framework), the newly articulated strategies and the SPMS are expected to mobilize the organization's human

resources to value creation. In particular, the BSC promotes alignment and focus, influencing the organization's leadership, organizational structure, control practices, and the HR initiatives aimed at improving the skill sets of employees (Becker et al., 2001). For example, a company that consistently tracks employee skills needed versus skills available to execute the strategy through its BSC will be better prepared to invest in training programs that actually target skills that are critical for implementing organizational strategy. Similarly, organizations that have more effective and high-quality-information SPMS alert their managers to what changes in high-performance work practices (Huselid, 1995) are necessary to execute the strategies. As the purposes for which the SPMS are designed expand to include a strategic emphasis on value drivers, the SPMS create a need for new HR initiatives to promote strategic alignment (through leadership, changes in structure and control practices) and to ensure that current and potential employees have the knowledge and skills (through recruiting, training, and turnover) to act in ways consistent with the newly articulated strategic priorities. The use of performance measures that capture both the financial and nonfinancial dimensions of performance is also expected to influence HR practices, as gaps in performance make evident the need for reallocating authority or acquiring new employee skills.

Hypothesis 6. The impact of SPMS on business results is positively related to the impact of SPMS on human resources, the degree of BSC adoption, the effectiveness and information quality of SPMS, their design purposes, and the use of performance measures.

When SPMS enable the firm's human resources to contribute to value creation through strategic initiatives, the full potential of human capital is realized and translated into business results. In fact, HR practices, when aligned with the firm's competitive strategy (external fit), can become a source of sustained competitive advantage and promote synergies among all processes for acquisition and development of the firm's human capital (internal fit), leading to improved business results (Huselid, 1995). By measuring the strategic role of human resources in the BSC, firms that have fully adopted the BSC can align employee performance improvements at the individual level with improvements in business results at the firm level. A fully implemented BSC mobilizes existing resources (e.g., people, technology, relations with customers) to the achievement of the newly articulated strategies. As Kaplan and Norton (2001b) highlighted, it is not a new product or a new group of employees that explain the performance

gains realized by companies soon after successfully implementing the BSC; rather, those gains are explained by the implementation of the BSC. Thus, we also expect in our model that the degree of BSC adoption will positively influence business results.

Effective and high-quality-information SPMS, by focusing attention on strategic priorities, facilitating communication across functions and departments within the firm, and promoting action that is consistent with organizational goals, should also contribute to the impact of SPMS on business results. As companies design the SPMS to make the strategy more transparent and meaningful to employees, and include purposes for the SPMS such as managing strategy or supporting relationships with customers and suppliers, the linkages between strategy and daily tasks become more visible, facilitating coordination and learning, thus improving business results. In companies where managers have more information from a wide range of performance measures available to make decisions that impact future performance, managers have more confidence that they are managing all critical areas of the business, so the impact of the SPMS on business results is expected to be stronger (see, e.g., evidence by Ittner & Larcker, 1998a, relating customer satisfaction performance to future accounting performance).

4. RESEARCH METHODS

4.1. The Survey

Data for this research were obtained from the American Institute of Certified Public Accountants, based on the Performance Measurement Practices Survey (AICPA & Maisel, 2001). The large sample (N = 1,990) includes every industry in the Dow Jones Global Industry Groups classification.

4.2. Measurement of the Variables

All items included in the measurement of variables are listed in Fig. 1. Financial and nonfinancial measures consisted of 9 and 10 items, respectively, to which participants were asked whether the respondent's business unit used that measure to evaluate business unit performance.

The other variables were measured on a five-point Likert scale to show the extent to which each item was applicable to the respondent's business unit (see Fig. 1 for details):

- design purposes: 12 items dealing with purposes for the SPMS (1 = not used, 5 = extensively used);
- information quality and effectiveness: one item each (1 = poor, 5 = excellent);
- degree of BSC adoption: eight items pertaining to dimensions of the business on which the SPMS had a cause-and-effect relationship (1 = no effect, 5 = significant effect);
- impact on HRs and business results: 6 items listing HR practices, and 10 items listing aspects of the business (1 = no effect, 5 = significant effect).

Table 1 shows descriptive statistics for the eight variables used in this study. The number of observations varies due to missing values in questionnaires that were returned with incomplete answers. Still, at least 1,680 answers were obtained for the eight variables. For the six variables that encompass multiple items, Cronbach alphas are at or above 60%, suggesting relatively high reliability and ensuring that these variables form internally consistent scales. The correlation matrix among the eight variables appears in Table 2, indicating that all coefficients were significant at the 0.001 level. Consistent with arguments in the performance measurement literature (Hemmer, 1996; Bento & White, 2006), we found a significant correlation between the use of financial and nonfinancial measures, suggesting that sample companies strive to balance traditional metrics that track past performance with the use of future-oriented performance indicators.

	Mean	Standard Deviation	N
Financial measures	13.1	1.9	1,925
Nonfinancial measures	13.3	1.9	1,913
Design purposes	38.6	8.9	1,867
Information quality	2.9	0.8	1,808
Effectiveness	3.1	0.9	1,876
Degree of BSC adoption	24.6	5.7	1,749
Impact on human resources	17.2	4.8	1,800
Impact on business results	28.9	7.4	1,680

Table 1. Descriptive Statistics.

	1	2	3	4	5	6	7	8
1. Financial measures	_	0.415	0.224	0.094	0.085	0.215	0.131	0.209
2. Nonfinancial measures		_	0.387	0.180	0.282	0.335	0.313	0.410
3. Design purposes			_	0.402	0.619	0.643	0.576	0.650
4. Information quality				_	0.546	0.333	0.291	0.360
5. Effectiveness					_	0.483	0.456	0.517
6. Degree of BSC adoption						-	0.650	0.758
7. Impact on human resources							-	0.667
8. Impact on business results								-

Table 2. Correlation Matrix of SPMS Variables.

Note: All significant at 0.001.

4.3. Data Analysis

We performed path analysis to determine the relationships among the variables described in Fig. 1. We tested whether SPMS characteristics affected SPMS outcomes and which SPMS characteristics and outcomes had a direct or indirect impact on performance (on HR practices and on business results). This technique helped us to investigate not only the relationships within each set of variables but also to compare the relative magnitude of the relationships among sets of variables.

Stepwise regression analyses were performed to determine the path coefficients for the relationships among the variables proposed in the model for this study. Each dependent variable was regressed on all variables that preceded it in the model, according to the hypotheses developed in the previous section. Beta weights or path coefficients are reported instead of partial correlations (regression coefficients) because the beta weights indicate the extent to which a change in the dependent variable is produced by a standardized change in one of the independent variables, after controlling for the other independent variables (Blalock, 1979). Path analysis was selected for this study because it explicitly uses existing theory and the hypothesized relationships among the variables to test the strength of those relationships. Path analysis does not require the same limiting assumptions about the type of data and statistical distributions that other approaches require, so it better fits the type of perceptual, ordinal data found in this survey (Bento & Bento, 2004; Simon, 1954).

5. RESULTS

As shown in the path analysis diagram in Fig. 2, the significant and positive path coefficients provide empirical support for our strategic performance measurement model:

5.1. Hypothesis 1

We found a significant direct effect of the use of nonfinancial measures on the purposes for which SPMS are designed, lending support for Hypothesis 1. The effect of the use of financial measures on design purposes is only indirect, through its influence on the use of nonfinancial measures, suggesting that it is the extent to which nonfinancial measures are used that mostly determines the purposes of the SPMS.



Fig. 2. Results.

5.2. Hypothesis 2

SPMS design purposes have a significant and positive effect on information quality, consistent with Hypothesis 2. Companies that emphasize design purposes ranging from measuring business results to managing suppliers tend to implement SPMS perceived to be of higher quality. We found only indirect effects of the use of financial and nonfinancial measures on information quality.

5.3. Hypothesis 3

Both information quality and design purposes have significant effects on SPMS effectiveness, in support of Hypothesis 3. The performance measures used have only an indirect effect on effectiveness, through their influence on design purposes.

5.4. Hypothesis 4

The degree of BSC adoption is influenced by design purposes and effectiveness, as predicted in Hypothesis 4. The purposes for which SPMS are designed have a much stronger effect than SPMS effectiveness on the extent to which the BSC is actually adopted in practice, after controlling for other factors such as information quality, and the use of financial and nonfinancial measures. This finding is consistent with claims in the literature that it is the various purposes for which the SPMS are designed that determine if the BSC is actually fully adopted (Ittner & Larcker, 2001).

5.5. Hypothesis 5

The impact of SPMS on HR practices such as employee recruitment and turnover is mostly influenced by the degree of BSC adoption, followed by the direct influences of SPMS design purpose and effectiveness. In companies where the SPMS are designed for more strategic purposes, SPMS are perceived as more effective and the BSC is actually fully adopted, with a noticeable impact on human resources. We found no direct effects of information quality or the use of financial and nonfinancial measures on human resources: it appears that information quality and performance measures have only an indirect effect on HR practices, through their relationships with design purposes and effectiveness.

Therefore, regardless of the type of performance measures used, or whether managers consider that the SPMS provide high-quality information, companies that do not limit the SPMS to traditional purposes (such as measuring business and individual results) but also deploy the SPMS in nontraditional ways – to communicate values and culture, and management directives, while adopting the BSC to its full extent by maintaining strong cause-and-effect linkages between the SPMS and customers, shareholder value, technology infrastructure, and employee performance – reap stronger benefits from their SPMS in terms of improved HR practices.

5.6. Hypothesis 6

HR practices, in turn, along with degree of BSC adoption, and two SPMS characteristics, design purposes and the use of nonfinancial measures, lead companies to enjoy the full payback of SPMS implementation, measured as the impact of the SPMS on business results (Hypothesis 6). The direct effects of SPMS design purposes and degree of BSC adoption on performance are even more pronounced than the effects of information quality and effectiveness on performance.

Interestingly, when we tested for the direct relationships of the use of individual nonfinancial measures with the impact on business results, while controlling for the other variables in the model, the relationships were much weaker. This result supports the assertion from prior research that it is the use of a whole integrated set of nonfinancial measures, instead of the isolated use of one or two measures, that drives SPMS impact on performance (Chenhall, 2005). In our study, we show that this effect of the use of nonfinancial measures on business results is both direct and indirect, through its influence on the purposes for which SPMS are designed.

An examination of the path coefficients in Fig. 2 reveals that the degree of BSC adoption (which is heavily influenced by design purposes) has a stronger, *direct* effect on business results than any other variable in our model. Furthermore, the degree of BSC adoption also has an *indirect* impact on business results, through its strong and positive influence on how SPMS impact HR practices. Combining the direct (47.5%) and indirect (11% = $45.5\% \times 24\%$) effects of degree of BSC adoption on business results, it appears that the degree of BSC adoption is the single most important factor in our model, explaining more than half (47.5% + 11% = 58.5%) of the

variation in the impact of the SPMS on business performance, influencing critical business results such as business strategy, productivity, revenue growth, operating quality, and process improvement programs.

Using the path coefficients from Fig. 2, a similar analysis can be performed of the *direct* (15.4%) and *indirect* effects of design purposes on business results, by estimating the influence of design purposes on human resources and, in turn, HR impact on business results ($19.9\% \times 24\% = 4.8\%$), plus the influence of design purposes on BSC adoption and, in turn, BSC adoption's direct ($50.4\% \times 47.5\% = 23.9\%$) and indirect ($50.4\% \times 45.5\% \times 24.4\% = 5.5\%$) impact on business results, resulting in design purposes explaining a total of almost half (15.4% + 4.8% + 23.9% + 5.5% = 49.6%) of the variation in the impact on business results.

These findings help explain the conflicting results of Niraj, Foster, Gupta, and Narasimhan (2008) and Ittner and Larcker (1998a), who tested for the direct effects of isolated nonfinancial measures on various performance dimensions. Our findings suggest that, beyond the simple use of nonfinancial measures, the full adoption of the BSC, along with the improvements in HR practices triggered by the SPMS, consistent with a wide range of SPMS purposes, set in motion a complete value-creation cycle of planning, measuring, controlling, rewarding, and re-evaluating the strategy.

6. SUMMARY AND CONCLUSIONS

This study was designed to address the general question of whether SPMS have a significant impact on firm performance. Our empirical results, based on data from 1,990 organizations, from a wide range of industries, suggest that the answer is yes, justifying the significant resources (both human and financial) firms have deployed for the design and implementation of SPMS. Thus, our study contributes to the more recent SPMS literature (which we coined the "so-what" literature) by providing empirical evidence in support of the positive effects of SPMS.

According to the regression results summarized in Table 3, the impact of the SPMS on business results is explained by four main factors: degree of BSC adoption, impact on HRs, design purposes, and the use of nonfinancial measures. Together these four factors account for 68% of the variation in the impact on business results. Among those relevant factors, the degree of BSC adoption is clearly the most significant.

Those results both confirm and expand on the existing SPMS literature. Consistent with previous studies (Banker et al., 2000; Bento & White, 2006),

Dependent Variable	Independent Variables	β	${ar R}^2$	Significance
Impact on business results			0.68	0.0001
1	Degree of BSC adoption	0.475		
	Impact on human resources	0.240		
	Design purposes	0.154		
	Nonfinancial measures	0.117		
Impact on human resources			0.46	0.0001
-	Degree of BSC adoption	0.455		
	Design purposes	0.199		
	Effectiveness	0.120		
Degree of BSC adoption			0.42	0.0001
	Design purposes	0.504		
	Effectiveness	0.122		
Effectiveness			0.48	0.0001
	Design purposes	0.475		
	Information quality	0.353		
Information quality	Design purposes	0.399	0.16	0.0001
Design purposes	Nonfinancial measures	0.388	0.15	0.0001
Nonfinancial measures	Financial measures	0.415	0.17	0.0001

Table 3. Regression Results.

our model shows the positive association between the use of nonfinancial measures and performance. Also consistent with prior BSC research, our finding that the impact of the SPMS on HR practices is positively associated with improved business results reinforces the BSC framework, illustrating linkages between the learning and growth perspective with the other BSC perspectives. Our results further show that 46% of the impact of the SPMS on HR practices is determined mainly by the degree of BSC adoption, followed by design purposes, and effectiveness.

Expanding on the existing SPMS literature, we introduced two new variables in our model, the degree of BSC adoption and design purposes, which are both among the top three most significant factors in explaining the impact of SPMS on performance. The degree of BSC adoption has the strongest direct effects on the impact of the SPMS on human resources and business results. Design purposes emerges as a critical variable in our model, since it is the single most important factor in explaining all three SPMS outcomes examined in this study – information quality, effectiveness, and the degree of BSC adoption – and it influences both forms of the SPMS impact on performance.

Future research in performance measurement may further investigate which factors determine the two new variables we introduced here, degree of BSC adoption and design purposes. Our model offers initial insights into which variables lead to a higher degree of BSC adoption. We found that the degree of BSC adoption is mainly influenced by design purposes and effectiveness; these two variables alone explain 42% of the variation in the degree of BSC adoption. The design purposes variable, in turn, is significantly influenced by the use of nonfinancial measures. However, given the relatively low adjusted R^2 (15%) for design purposes, additional studies will be needed to identify which other variables not in our model best explain cross-sectional differences in design purposes.

Our study also integrates variables from the literatures within two closely related functional areas: the performance measurement literature (concerned with SPMS and its performance effects) and the information systems literature (concerned with information quality and effectiveness). We found that effectiveness, which is the second most important SPMS outcome in influencing the SPMS impact on human resources, is significantly explained by design purposes and information quality (adjusted $R^2 = 48\%$).

Our results suggest that future researchers can provide a valuable contribution to the SPMS literature by investigating what other factors interact with the SPMS characteristics and outcomes presented here to yield performance results. In this study the impact on business results variable included financial and nonfinancial dimensions of performance, improving upon previous studies that focused only on stock market performance (Ittner et al., 2003b). Future research could test alternative specifications of the model proposed in Fig. 2, and use model fit statistics to verify which model is superior in explaining SPMS outcomes and impact on performance.

Furthermore, the extent to which the perceived impact on business results reported by the respondents in this study actually translates, over time, into accounting-based or stock-based performance remains an interesting empirical question. We intend to pursue this question in a follow-up study using archival data to address some of the limitations of the perceptual data obtained through this survey.

By providing additional empirical evidence that SPMS impact performance, we hope to have also informed practitioners in charge of designing and implementing SPMS about some factors deserving of their attention. Our findings imply that design purposes and degree of BSC adoption are, indeed, important for the impact of the SPMS on business results; as such, we propose that they should not be simply delegated to finance or accounting professionals, but require full participation by the whole management team.

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